Textile industries.

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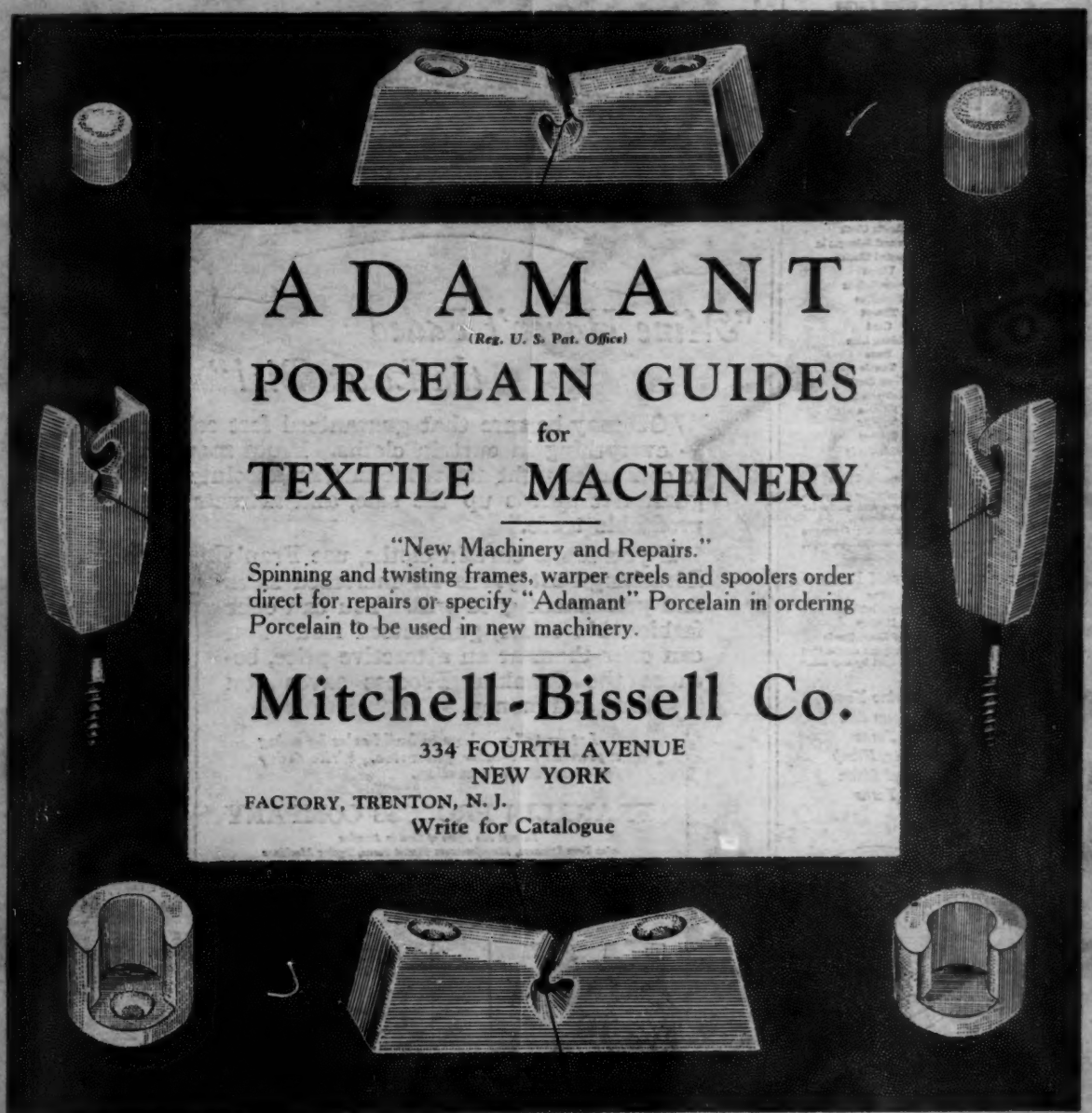
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THE buyer is often confronted with the problem of selecting a source of supply from among several producers offering substantially the same quality product at slightly different prices.

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With the Publishers—

Did You Ever Attempt to Itemize the Bill?

Wouldn't it be interesting if COTTON was sometime able to itemize the services rendered each subscriber and then instead of mailing a receipt for $1.00 for "a year's subscription" send a receipted bill for a long list of services? It might read something like the following:

"To informing you how your particular problem could be solved by showing you how someone else did it successfully.

"To traveling expenses of trained man to and from the plant that had solved your problem.

"To salary of trained man sent to inspect this plant and gather the details for your use, including the drawings, photographs and a multitude of other detail.

"To putting you in touch with the makers of the necessary equipment and supplies needed to overcome your difficulty."

Undoubtedly we could go on and make out a long list of services that were rendered to individual subscribers, provided we were able to check up on the actions of these individuals following the reading of each issue. Not that we have any desire to do so but it just strikes us what an impressive way it would be of stressing the work that COTTON is doing.

Wouldn't an itemized statement of services rendered look big for a dollar a year?

It isn't an original idea with us. It came to our attention through an account of how one professional man managed to secure much of the good-will and the greater part of the business in a town by putting down on his bill every detail of his service that cost him money, either through hiring assistants or investment in equipment. His patrons knew just what they were being charged for; his competitors having merely made out a blanket bill for so many hundred dollars with the result that their patrons always felt, "that bill is rather steep."

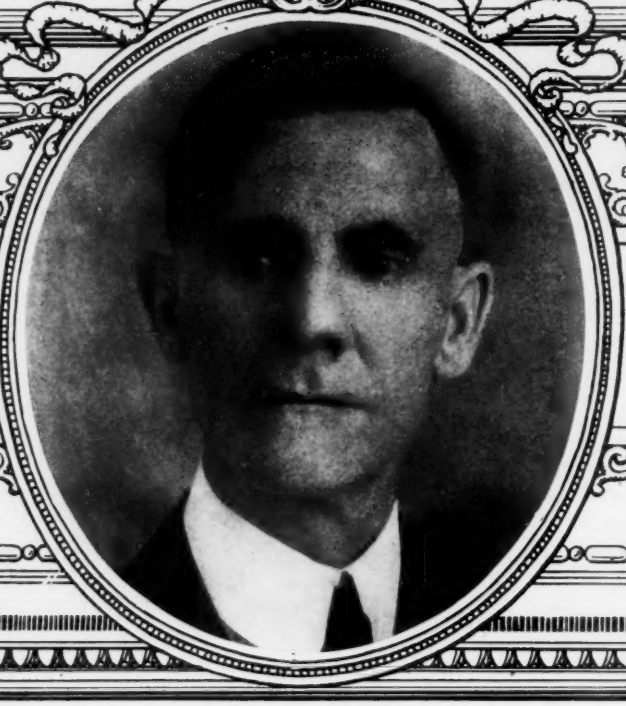
Then there is another angle to this proposition. Let us consider a hosiery manufacturer reader who is fairly well satisfied with conditions at his mill. He doesn't know that he has a problem, perhaps, at least he's not worrying about it. One day he reads an item in "Knitting Kinks" how another hosiery mill manager saved six cents a dozen in waste on the production of his mill. Finding the suggestion applicable to the lines he is then making he figures up the saving on his production of two thousand dozen a day. Shades of Ponzi! Twelve copies a year for a dollar and this much of a dividend from one issue or on an investment of one-twelfth of a dollar!

Just another impressive example of what COTTON does for its readers.

As a matter of fact, COTTON can never know just how much assistance it is giving to the textile industry; nor is it weeping because of lack of appreciation. It gets enough voluntary testimonials from its readers to know that even though it has not reached a stage of perfection it is working in the right direction. Another bulwark of confidence is the support given the paper by the advertisers who have used its pages persistently. These concerns would not, as a matter of business remain with us, if they were not getting results. Also they could not remain in business if the equipment and supplies bought by the readers of COTTON did not prove profitable to the firms that bought them.

No indeed! COTTON has no intention of trying to trace the benefits that the individual readers receive from its pages. It always likes to know when somebody has a reason for especial gratification. But even then, as much as any human being likes an occasional shoulder pat, its publishers are pretty well satisfied to have the approval take the form of boosting COTTON to some other man who can use it to advantage—boosting it until he, too, sends in a subscription and becomes a satisfied reader.

AMONG COTTON'S READERS



B. J. Dobbins

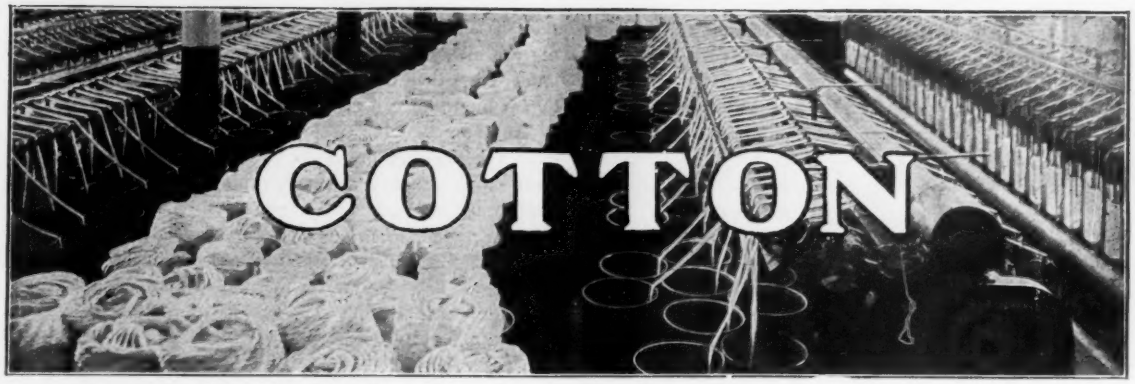
Vice-President, Assistant Treasurer and General Superintendent,

Rex Spinning Company,

Gastonia, N. C.

"I have been a subscriber to COTTON ever since it has been a publication, and consider it the best textile journal that comes to my office."

B. J. Dobbins.



November, Nineteen-Twenty-Four

The Tariff Commission Proves the Rule.

"If you want nothing done," someone cynically though wisely has said, "refer it to a commission." Henry Ford has said: "A board is a plank with splinters on it."

The public board or commission that does anything worth while is a rarity; the one which does anything which couldn't be done ten times better by an individual scarcely exists.

In late years there has been big extension of what is known as the "commission form of Government" for cities. Generally it may be an improvement on the traditional form of city administration. But if this be so, the virtue does not lie in the principle of government by commission. Quite the contrary. It is because large and inefficient boards of aldermen and counciImen and commissions and committees of fire and police and sanitation are supplanted usually by a single small and compact body, on each member of which is placed specific as well as joint responsibility. The "commission form of government, for cities, in fact, means getting away in great part from the stagnation and demoralization inherent to those public bodies known as commissions.

This, however, isn't to be a critique on municipal government, for no principles as to this would fit into conditions affecting all of the hundreds of municipal establishments in this country.

But there is only one general or Federal government. To it the definite test of concrete principle can be applied.

For many years now the Federal establishment has been tending towards becoming a government by commissions. Federal commissions have multiplied and expanded to a point whereby these bodies overshadow Congress and rival even the importance of the White House.

They are peculiar agencies of government, especially of one like ours builded around the rule first defined by de Montesquieu of separate and independent departments. Federal Government commissions usually wield powers transferred to them from all of the three great departments of government, the executive, the judicial and the legislative. To a great extent they make, interpret and enforce law—which combination when embodied in a single instrument is the very essence of autocracy, if not tyranny.

What, beyond the development of vast and costly public machines, do they achieve? Next to nothing. The Interstate Commerce Commission is given the powers of a Czar, hundreds of millions of dollars for expenses, and all time for the regulation of the railroads. Yet as its regulating tentacles spread out until control over veritably every detail of railroad operation is established, the cost of transportation goes up and railroad efficiency declines. The Federal Trade Commission, set up to help business, develops into a largely irresponsible crusader against business. The Shipping Board, created to put American ships on the seas, develops into what might appropriately be termed a body empowered by the Government to drive American ship owners off the seas.

One would have difficulty proving how or when a Federal regulating commission has ever netted the public a dollar. Here and there one does render a service; but on the whole the harm they have done has far more than offset the good achieved.

There are many reasons why this is so, and to state them all would fill many pages. The chief one is irresponsibility. Who ordinarily knows or cares to know the names of the persons who sit on these commissions? You can't vote for or against them. They are shielded by the impersonal quality which is the presumed virtue of public commissions. Each one can always dodge the blame by disclaiming any hand in the transaction.

There is the United States Tariff Commission—which all the above was intended to lead to. It is the product of very fine sounding theory, long pressed by excellent thinkers. It was to take the tariff out of politics and apply to that difficult problem the clarifying potent of science. No governmental commission ever seemed to be better warranted in both fact and theory.

What is the product of several years' experience with it? Worse than nothing. Excepting perhaps its collecting of information—and that could have been better done by the Department of Commerce—the Tariff Commission merely has added confusion to a problem already overwhelmed by confusion.

It has investigated, investigated, and investigated—but barring two or three somewhat noticeable exceptions it has gone no further. Its only actions have been in the paradoxical direction of inaction.

Yet it always represents the threat of action, thus enhancing that factor of uncertainty which was a great objection to the old system of purely Congressional handling of the tariff. With scores of cases that have been before it practically since the last tariff gave it power with the President's approval to raise or lower rates, only one, at

this writing, has been put through to completion. That was the wheat case, which was as ear-marked with politics as any schedule that ever came out of Congress. After an investigation made in a few weeks it recommended a raising of the tariff on wheat. This was done—and the price of wheat immediately went lower. The price of Canadian wheat, which was to be shut out, soon thereafter went beyond that of American wheat, which still is the case. Since then, at least, two other cases have been submitted to the President, both at this writing waiting to be acted upon finally.

At this rate of progress it would take the Tariff Commission a hundred years to arrive at conclusions on one-half the schedules in the present tariff law.

This hopeful adventure into commissionism is, like all the rest, proving a sad disappointment. Moreover, it partakes of dangers not inherent to others. This is because it transfers power to initiate the raising and lowering of certain taxes not only from the House of Representatives (which definitely is amendable for its acts every two years) but from Congress as well. It not only transfers this power to the executive branch of government, contrary to a thousand years of effort on the part of Anglo-Saxon peoples to keep the purse strings out of the hands of those who administer; but it puts the power to tax into the hands of a body, which the voters can reach only indirectly and, as experience shows, scarcely at all.

The Congressional method of dealing with the tariff has been abominable, it is true; but experience to date doesn't indicate that the commission method is any improvement. In fact, so far the new method has been worse.

The lesson, however, goes beyond the mere question of the tariff. Succintly, it is that you can't govern a nation like ours through commissions. For fact-finding purposes these bodies may be of some use; otherwise, they are carbuncles on government, on business, and on the economy of the nation.

Getting to the Roots of Unemployment.

The Russell Sage Foundation has issued a preliminary report on the most extended inquiry ever made in this country into the question of unemployment. The investigation has been going on for six years.

It states that regularly in this country from one to six million persons who must or would work are idle at all times, the variation depending on general conditions. It states that from ten to twelve per cent of all workers are out of jobs for periods varying from a few weeks to several months every year.

The Foundation believes that this presents a problem which should be dealt with in a national way, for social and political as well as humanitarian reasons. With so many persons, most of them actual or potential voters, if not potential bolshevists and what else, out of touch with payrolls, the Foundation thinks that the Federal Government would be warranted in handling the problem. It is suggested that the Government operate employment agencies, somewhat after the establishment for that purpose set up during the war and still maintained in miniature form. These would take the place of private agencies, the source of many grievances on the part of job seekers.

The complete report should be awaited before conclusions based upon it are formed. Necessarily a lot of people are always out of work not because they can't get it but because they don't want any at all or dislike the particular kind they can get.

Anything like 100 per cent employment is neither possible, practical nor desirable. There must always be a reserve supply of labor, as of other things, with which to facilitate transition and meet emergencies. Labor itself must have its periods of rest and its experiences of change.

For the Government to undertake to find jobs for all the unemployed and workers for all unfilled places might prove a dangerous experiment. The next move would be a demand for unemployment doles, with which, as one economist puts it, a nation always can buy all the unemployment and poverty it may want. From facilitating employment, the Government might come to promote idleness by making idleness easy if not profitable, as some European countries are doing.

However, the problem is one which employers themselves might tackle in a national cooperative way. All employers know that it often pays to provide employment even at a loss. It will pay them in the long run to keep general unemployment from becoming excessive.

The man who wants one and can't get a job may easily turn into a danger both to himself and the public. This isn't altogether because of the suffering which may result from unemployment. A deeper psychology is involved. It is illustrated by the fact that emphasis is always put on wanting work rather than a source of livelihood. For work is as much a spiritual as wages are a creature necessity. Idleness, aside from the distress often going with it, nurtures mischief. The most mischievous of all human nuisances usually are persons with just enough fixed income to enable them to live without work and not enough to keep their minds occupied.

One Radicalism that Didn't Get a "Rise."

This was written prior to the national election, at a time when the result of the voting on candidates was not known.

But one particular result easily could be anticipated at that time. No matter who has been elected or how great the vote cast for anyone of the candidates, this is certain: No headway was made for the proposal that our written Constitution be virtually repealed. This proposal was put forth by one of the Presidential candidates in the form of a demand that Congress be given the power to "override" Supreme Court "vetoes." That is, he would have it so that Congress by repassing it could make valid a measure annulled on Constitutional grounds by the Supreme Court.

The proposal received but scant show of approval, even in radical quarters. Those sponsoring it quickly realized that putting it forth had proved bad politics. So no matter how many votes their candidate received, it may be taken for granted that not many of them were earned by the platform plank dealing with the Supreme Court. This proposal should and probably will go into the historical discard, along with Theodore Roosevelt's equally absurd one, made a dozen years ago, that the voters be given the power to "recall" judicial decisions.

So long as we have a written Constitution, power to preserve it must lie in some judicial body. By all means this body should be safe and secure from the fitful winds of passing opinion.

To say that Congress under any circumstances may make an act Constitutional merely by saying that it is so, means putting Congress above the Constitution. This in turn would mean the annulment of the Constitution. We still might develop an unwritten Constitution, like the revered and no doubt great one developed through a thousand years of Constitutional evolution by Great Britain. After a thousand years, our unwritten Constitution might be even a better one than we have now; but it wouldn't be worth the price that would have to be paid for it.

Clear and positive rejection of this, together with similar proposals of revolution, shows that the American public when given a fair chance to do so usually may be depended upon to act sanely on big fundamentals.

Some Problems in Compensation Insurance

BY DUNHILL MARSDON.

This article was inspired by local Georgia conditions and many of the references apply to conditions in this State, but the same general principles or laws govern all states and each reader can make an application of them in the light of conditions in his own state. It is the belief of the writer that this article will furnish a basis for the study of compensation insurance and its application that is worth considering.

It is a very complex problem and is the forerunner of two other even more complicated problems, which are destined to occupy the minds of the employers, i.e., old age insurance and insurance for the unemployed. These complexities are brewing in the substrata of political life and soon will be actively agitated.

For this reason, it is necessary for the executive to be an active student of all forms of social insurance.

The cotton manufacturers were summoned into court to show why the rates on compensation insurance shall not be increased from a base rate of 44 to a base rate of 57. This increase indicates nearly a 30 per cent increase in manual rates. This increase of 30 per cent in manual rates, if comparable in the same ratio to other rates indicates about 45 per cent increase in the amount collectable. If a policy has been written for a premium of $4,000, under the present rating a very substantial increase will be necessary if the present demands are met.

The manufacturers came to court and said, "Before we proceed further, we wish to ask the insurance companies to show us why we should even consider an increase in rates, what are the facts?"

In response to this, the following statements as to costs were made by insurance carriers:

SERVICE COSTS:		
Investigation and Adjustment of Claims	8.0%	
Payroll audits	2.0%	
Inspection and Accident Prevention	2.5%	
Total Service Costs		12.5%
EXPENSE COSTS:		
Acquisition	17.5%	
Home Office	7.5%	
TAXES:		
State Premium Tax	1.5%	
Support of Industrial Commission	4.0%	
Municipal Premium Tax	1.0%	
Federal Taxes, Licenses, Fees, etc.	.5%	
	7.0%	
Total Expense Costs		32.0%
Total Service and Expense Costs		44.5%

Forty-four and Five-tenths Per Cent of Present Premium Will Not Pay Expenses.

The case is still pending, but there have been several points developed that may be worth while considering.

1. Is the overhead of the insurance companies too heavy? It costs the manufacturer forty-five cents to have the insurance company collect a dollar and pay back fifty-five cents to the injured employee.

An analysis of this overhead reveals many questionable points, but it does not lie within the scope of this article to discuss all of them.

In studying this question, you will recall that the State places a tax of 1½ per cent on the premiums written on compensation insurance in Georgia. This money is turned into the State Treasury and into the general state fund. There is an Industrial Commission in this State, made necessary by statutory enactment and it is a necessary concomitant to compensation insurance. The State does not make any appropriation out of any state funds to care for this expense but says, "The expenses of the Industrial Commission shall be borne by the insurance companies in proportion to premiums written." This expense makes a direct tax further upon the insurance companies, of 4 per cent, which they immediately reflect into the rate.

Does it seem fair to tax the industries of the State 1½ per cent of this premium and turn this into the General Fund of the State Treasury for general State purposes and then indirectly levy upon them a tax of 4 per cent to support the Industrial Commission? The Industrial Commission is a legal institution of the State Government, yet it is wholly supported by a class who have already contributed to the State support.

Nor is this all. In many cities and municipalities there are varying taxes, averaging over the state a little more than one per cent of the premium written in compensation insurance. These cities levy these special taxes for general funds, and then lay on industries located within their borders various and sundry ad valorem, special, etc., taxes for the upkeep of their political and administrative machines. This special municipal tax on insurance companies is immediately reflected to the industry in the form of increased rates. The tax intended to reach the insurance company does not reach the company from a financial viewpoint, it only makes the insurance company a tax collector. This extra tax involves a heavier overhead, and the carrier immediately increases his overhead and reflects this in the rate charged to the industry for carrying the risk.

Nor is this all. The Federal Government requires a tax of one-half of one per cent on all premiums on compensation insurance. This, too, is reflected in the rate.

The final summation of the whole matter is that the in-

dustries of Georgia pay a state and government tax of 8 per cent, while the average for other states is between two and four per cent.

Is this fair to the manufacturer who must compete with like industries in other states? Is it a very inviting situation to place before new industries desiring a location in the South? Is any form of legislation able to remedy this condition? Can such legislation be enacted? The State Legislature will be in session next summer, and this subject is thus left for the consideration and action of manufacturers.

However, it might be apropos to insert a word of warning right here to those manufacturers located in states at present enjoying the low tax rate. There is nothing perpetual about that tax rate. It can be changed by the state legislature. Furthermore, it is only one item in this compensation insurance cost.

Acquisition Cost.

Downey, in his treatise on "Compensation Insurance" (MacMillan Publishing Company, 1924) says: "Wherever insurance is compulsory, agents' commissions can well be limited to ten per cent. Claim adjustments under a liberal scale of benefits and with efficient administrative supervision need not cost more than three per cent of any large insurance carrier. Other insurance, including two per cent for taxes should not exceed twelve per cent. In short, twenty-five per cent of premiums under an adequate scale of benefits should be a sufficient expense provision for stock companies * * * * *. No such drastic curtailment of expenses is to be looked for through the voluntary action of insurance carriers."

Compensation insurance is mandatory in Georgia. If the insurance carriers used no agent at all, the industries would call at their offices for policies. Is it fair and just to charge an organization whose premium is three thousand dollars, five hundred and twenty-five dollars for soliciting the business, when the organization must place this business with some carrier? As Downey says, "Does it not seem fair to suppose that ten per cent is sufficient expense to charge against it?"

Further on in the same Chapter, he says:

"Current accounting systems do not furnish a proper segregation of expenses by states or by lines of business. Only commissions and taxes are specific. The same field adjusters and the same home office staff handle compensation, burglary, plate glass, automobile and public liability insurance. Claim and home office expenses are pro-rated to states and to lines of business by amount of premiums. Commissions and taxes being fairly uniform, this method of accounting gives the same apparent expense ratio for high benefit and low benefit states, and for the populous eastern communities as for Colorado or Montana. The same accounting device, in the opinion of the writer, loads the claim and home office cost of compensation with expenses properly chargeable to automobile and public liability lines."

The Industrial Commission.

The statements made here are not made in a critical mind, but to call to mind the fact that a checking up should be made occasionally.

The law does not set any limit on the expenses of the Industrial Commission. It simply says that the expenses of the Commission shall be borne by the carriers, proportionately. Is the Industrial Commission as economical as it should be? Are there expenses that might be eliminated? Are unnecessary expenses incurred because of the fact that no fixed appropriation is allotted? Is business as expeditiously handled as if it were private and personal. What hours are observed? How many hours constitute a day's work? Is the present way of selecting the Commission a good one? Is it inclined to be too political, both in its selection and action? Is there anything that could be done to reduce expenses and at the same time not impair the efficiency of the Commission? What could be done to strengthen it?

The writer is not insinuating any evil or reflecting any dubious mental state in setting forth these questions. Compensation insurance rates are running rampant and like other business, business methods must be used to find the cause.

Cases Before the Commission.

Who pays for the expenses of hearing the cases? Who pays for the traveling expenses of the Commission? Is it the Insurance Company? Is it the employees? Is it the State as a whole? It is only one party or group, and this party or group are the insured, or the industrial interests of Georgia. Many people think the Insurance Companies pay all expenses, damages, etc., but they pay not one cent. They simply collect it out of the industries and distribute it, keeping their proportionate share for acting in this capacity.

Is the strict interpretation of the law with reference to awards or medical aid adhered to? It was developed at an informal hearing that mercy and expediency were always on the side of the sick and disabled. This fact was practically acknowledged by the insurance companies, the employers and the commission. It shows the splendid humanitarian spirit that dominates industry in Georgia. Liberty and laxness of interpretation of law often develop into license and prostitution of purpose. Should there be a general tightening up of legal interpretations and awards? Is this lax method not destroying the real purpose of compensation insurance? Should the law not be strictly enforced and when it functions unjustly, let it be amended? Why have these evils crept in? On the part of the Industrial Commission, and the employer, because of their humane spirit, and occasionally, perhaps because of a political position or favor. On the part of the insurance company, because of the fact that they knew it did not cost them so they let it go and charged it back to the policyholder. Again the greater the premium, the greater the aggregate of business, the greater the income for overhead, as per their schedule indicated in the beginning of this article. It might be fair to say that the above statements are opinions, rather than statements of facts. But remember, the proposition is to find out why compensation insurance is becoming so burdensome. Is such a policy fair to employees, when it makes certain classes deceivers, malingerers, burdens to industry, and indirectly a tax upon those who desire to care for themselves and their families. Overhead of industries affects earnings and earnings affect wages.

Doctors.

There are many interesting things that can be related here with reference to the attitude of doctors. They may not happen in Georgia, but they happen. Some young doctor, a friend or relative of some member of the organiza-

tion, desires to increase his income by adding thereto specific and sure pay patients. He gets the job of looking after the sick and injured employees of an industrial organization. The more he can do, the more pay he gets. He does not understand the fact that every dollar he charges for services and collects from the insurance company is really collected from the industrial plant in which the employee works. He desires to take the utmost care of his patients. He desires to make a reputation for himself. He likes office patients. Most doctors do. It is reasonable that they should, when by sitting in their office with but little expense, they can interview ten or twelve patients per hour at a charge of two to three dollars per person.

Dressing of wounds, sterilization, consultations are often prolonged into seemingly unwarranted lengths. The doctor forgets that a triple tax is being visited on the plant. A tax for medical, a tax for compensation, a tax by reason of having a substitute worker.

The doctor must not forget that he is working for the industrial plant as well as the insurance company, the employee and himself. The harmonic balance must be observed. Seven days out makes a compensable case. The doctors certificate is valid proof. Does the doctor get the patient back on the job with as much haste as possible, and with as little medical cost as possible? The patient perhaps has been out six days or five days and should go back to work and not make a compensable case. The employee intercedes with the doctor and perhaps malingers for one or two days, while he fishes or visits, gets his certificate, his compensation, and goes back to work.

There are mental cases of all kinds, wherein not medicine or medical aid are needed, but mental treatment of a kind but firm type. There is malingering of all grades, from the most flagrant to the most deceptive. The doctor must be expert in detecting these cases. He must be an unbiased and unprejudiced advocate of justice in all cases, regardless of where justice lies. In concluding this topic, it may be well to state that the manufacturers want every case called for as science of medicine and humanitarian ethics. demand. What is necessary, and no more.

The Operating Executives.

If any man or group of men has any greater responsibility in the control of compensation insurance rates than another, it is the group of operating executives. This subject has been discussed in a previous article, so only the high points will be touched here.

How they may aid in its solution.

a. By a careful hiring policy.
b. By a careful placement policy.
c. By a careful supervisory policy.
d. By a careful adherence to the rules and regulations sent out by the insurance carrier.
e. By creating among the help a spirit of safety and security of person.
f. By a careful study and report of all accidents.
g. Encouraging the help to get back to work as soon as possible.
h. By a prevention of malingering.
i. By eliminating from the organization the unfit.
j. By a standard safety organization.
k. Study machine hazards.
l. Study operating hazards.
m. Safety appliances and devices.
n. Plant layout.
o. Slick floors, falls, pulleys, belts, steps, elevators, etc.
p. Use of first aid or emergency hospital, doctor, nurse.
q. What is a standard safety organization for this mill?
   (a) Members, numbers and qualification.
   (b) How selected.
   (c) Time and place of meeting.
   (d) Duties, etc.
r. What cases have you in mind that have occurred within the past six months?
   (a) Why did they occur?
   (b) Could they have been prevented?
   (c) Whose fault was it?
   (d) What was the cost?
s. Do you know anything about the medical cost in your mill?

The Employees.

The employee must realize that compensation is not a reward for sickness or disability. It is not intended to make chronic invalids, deceivers and malingerers, and deadbeats. It is not intended as a means of part pay for vacations, visits and fishing. It is not a provision for awards for carelessness, indifference and debility incurred through willful neglect of rules of health and hygiene.

It is an honest endeavor on the part of all concerned to prevent dependency and distress among people who are honestly and conscientiously trying to earn a decent living and save something for an emergency. This insurance is different in purpose and administration from any other form written. It has a greater humanitarianism and justice behind it of any other form of insurance. It is a direct tax upon the employer, who willfully and voluntarily places it upon himself for the benefit and sustenance of the honest worker in his plant.

Many employees have an idea that "getting something for nothing" is a great game. If they can beat the insurance company and get a compensation award, when perhaps they do not need it, they are indeed shrewd. The worker is always losing financially when he is away from his job on any illegitimate pretext. He is losing moral self respect and the moral respect of his co-workers. He is increasing the overhead of the industry and thereby reducing the earnings. This in turn is an indirect tax upon the honest, thrifty worker who is "fair and square" in all of his statements and designs.

The operating executives should create a spirit of safety, of sanitation and care, of respect for rules and regulations, of pride in the low rate of insurance, the small number of accidents, the care taken of the employees, the speed with which they return to work, the small number of days lost and many other attitudes which real live executives can instill.

The worker must get this in mind; *regardless of the amount of compensation received, he loses when he is away from his job.*

The Insurance Company.

There are two charges that can be made against the insurance company. They deny both, but so far they have been unable to convince the manufacturers that their negations are justified.

The first charge is that their overhead is too large. If these figures or percentages are applied to mass figures, it would seem that overhead hangs in massive sums over the business of compensation insurance.

The manufacturers are not so sufficiently informed as to

be able to advise the companies how they may be reduced, but according to the law of averages, they viewed the evidence submitted and replied that overhead must be reduced. The non-essentials must be eliminated. Too much form and system is involved. Simplify and reduce. Don't ask the manufacturers to pay for elaborate and infinitely detailed systems of some theoretical efficiency expert.

The second charge is that, the insurance companies have not exercised the care and caution in the administration of settlements of compensable cases that they did under the old liability insurance. Under the liability policy it behooved the insurance company to settle as economically as possible as there was no recourse on the industry if losses incurred were greater than premiums. Under compensation insurance the insurance company always has recourse to a new rate adjustment, which will enable it to recoup its losses, hence the suggested charge of indifference or laxness in vigorously following up the provisions of the law and the policy. These charges are stated as opinions and not as facts, and the burden of proof rests with the insurance company to furnish indisputable evidence of the invalidity of them.

Another question that was injected is, "Have the insurance companies exercised the proper care and precautions in assisting in the prevention of accidents?

It is true they have made the inspections and sent out the warning cards and other literature, etc., but have they really impressed or endeavored to impress the managers with the real subject of accident prevention?

They have complied with the letter of the law, but have they complied with the spirit of the law? Have the insurance companies exercised the proper care in selecting and instructing the medical men who care for the sick and disabled under the Compensation Insurance Act? Have they followed cases to the Industrial Commission and properly presented information to this body so that a just and equitable decision could be made by this body? If any or all of these charges are true in full or in part, should the insured be taxed with their discrepancies?

Legislation.

The compensation insurance law of Georgia is said to have been written by representatives of labor, employers and the Industrial Commission. The articles and sections contained therein were acceptable to all parties represented. While there was no expressed agreement, there was an implied agreement that no changes would be made on which there was not a unanimity of opinion.

This triple alliance has been adhered to in so far as investigations show. Yet there are lawyers in the legislature, theoretical and parlor reformers, who feel that they have superior knowledge and they can suggest changes and revisions that will be very wholesome to some one, hence during every session of the legislature, there are bills introduced, offering amendments. One or two of these have been passed and they have not been of any material advantage to the employee. They have even operated against him. They have also increased the cost of compensation insurance.

Compensation insurance is complex but it is very distinct in its purposes. The law is only three years old in Georgia, and all parties directly concerned are industriously studying its provisions and operations. If the legislators and reformers would let the inceptive promoters carry forth their plan, it would be better for all concerned. These extraneous parties know nothing of rate making, little about the purpose of compensation insurance, and nothing about amendments needed to make its operation better. If the manufacturers throughout the state could get the legislators to refrain from legislative modification, except such as has been recommended in the beginning of this paragraph, our law might be better construed in its various interpretations.

There is another phase of this subject that might be investigated. In compensation insurance, all industries are grouped and certain basic rates are established by the insurance commission. These rates are granted by the commission and any deviation from these rates shall follow certain well established rules and regulations, and shall apply to all insurers and insured. There is no competition. Every rate is automatically made and there is no competitive hustling for business or service for business secured.

Is this an advantage or a disadvantage? The writer has not intended to influence a decision. He only wants you to view this point of the condition.

Conclusion.

The following deductions are made as to the means and methods of making an increase in rates unnecessary, and at the same time allowing the insurance companies a reasonable return for their investment.

1st. Insurance companies must reduce overhead.

2nd. Insurance companies must vigorously apply the law in making adjustments and follow up appeal cases with zest and enthusiasm.

3rd. Insurance companies must wage an educational campaign in all industries, setting forth ways and means of preventing accidents.

4th. Insurance companies must educate their medical men into the proper interpretation of the letter and spirit of the law.

5th. Insurance companies must insist upon certain standards of safety and other prevention measures in industries.

6th. Employers must cooperate with the insurance companies in these five endeavors.

7th. Employers must seek some redress from the excessive taxes now imposed upon them indirectly.

8th. Doctors must be chosen with care and held responsible for the proper administration of the law.

9th. Operating executives must cooperate with plant managers and insurance companies in the manner indicated in the paragraph on "operative executives."

10th. The employee must be educated into a proper appreciation and acceptance of the operation of the law.

11th. Experimenters must be warned not to tamper with the modification or interpretation of the law.

12th. The Industrial Commission must carefully take stock of its expenses and if possible, assist in the reduction program.

13th. They must live more closely to the spirit and letter of the law, giving awards according to justice and not according to sympathy.

14th. Every interest involved in the application or reception of the law must put into effect a retrenchment of expenses.

If this program is industriously followed it will not be long until all companies are within a safe margin of in-

come and industries will be relieved of the necessity of any further burden in compensation insurance rates, and humanity will be blessed by a steadily and surely decreasing number of industrial dependents made by accidents. There are companies now doing business on safe margins with present rates. Other companies can do the same.

Rates do not need to be increased. Cooperation in making the law apply at the present rate, is all that is necessary. It can be done and it will be done when the proper parties make the decision to do so. The manufacturers have made their decision. They are not awaiting the approval and cooperation of the other parties. They are working now. In unity there is strength; in unity of purpose there is predestined success.

Loom Fixing

BY FRED A. CLOCK, M. E.

When both quantity and quality are desired, it is necessary that looms be kept in good mechanical condition and properly adjusted for the cloth being woven. If a loom is run at low speed it will sometimes weave fairly well although poorly fixed. However, if high speed and production are required, the loom must be well fixed or trouble will develop. There is a tendency on the part of some fixers to let a loom run as long as it will weave and hold together, then making only such repairs as are absolutely necessary. This is not always the fault of the fixer. The writer has heard of cases where an account was kept of spare parts and supplies used by each fixer and it reacted to his discredit if many supplies were charged to his account. It should be impressed upon all fixers that they should be very careful about waste, as spare parts and supplies, especially leather, run into money fast. On the other hand, they should feel perfectly free to requisition such supplies as are necessary to keep their section in good mechanical condition.

It sometimes happens that a fixer has a loom which requires extensive repairs but which will run and weave. If he does the required fixing at the time, a poor spot will be made in the cloth which may spoil a piece. Under these conditions he should let the cut go down and have the weaver stop the loom for him to make the repairs before starting the next cut. It may also happen that at the time he discovers the condition of the loom, he has so much work that many looms will be stopped if he takes the time to do the fixing properly. In this case he should make a note of the matter and properly fix the loom at his first leisure.

If ends break out badly, there is always a tendency for the fixer to blame the warp. It is true that a loom will not weave well with a warp that is poorly wound on the beam, that is poorly sized or contains poor yarn, but in many cases the weaving can be greatly improved by careful fixing. It is a good idea for a fixer to have a note book in which he notes any work which would be done on any of the looms in his section and to do the work as the opportunity presents itself. It is the writer's opinion that fixers as well as weavers should be held responsible for faulty weaving if the imperfections are caused by the condition of the loom.

This article refers to cam and dobby looms of the cone pick type.

Setting and Timing the Picker Motion.

The principal parts of a picker motion are shown in Fig. 1. Because of the many places in which a picker motion can be adjusted and the way these adjustments affect the picking of the loom, the proper setting and timing of the pick is one of the most difficult operations of loom fixing. The *power of the pick can be changed in the following ways:

1. The cam "h" can be moved nearer to or farther from the loom side, which will give a greater or less angular throw to the arm "g."

2. The lug strap "d" can be moved on the picking stick "b." Dropping "d" increases the power and vice versa.

3. Lengthening the lug strap "d" decreases the power and shortening it increases the power. Were it not for the

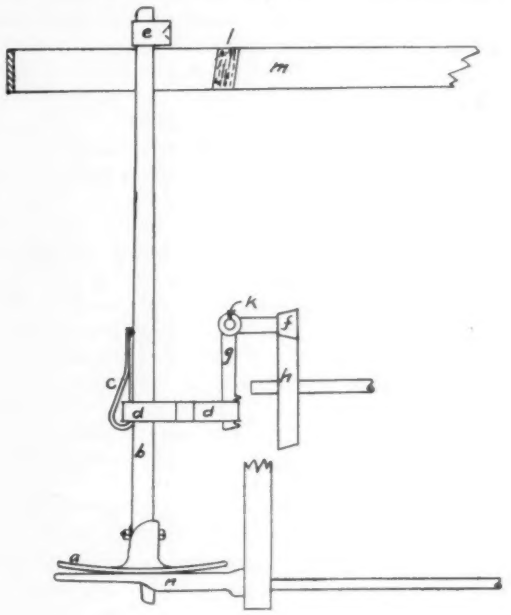


Fig. 1.

fact that the shuttle has to overcome the friction of the presser and the box between the time it leaves the picker and the time it enters the shed, the length of the lug strap would make very little difference with the power. The kinetic energy of the shuttle at that instant depends only upon the weight of the shuttle and the velocity of the picker. Provided the length of the lug strap is the only condition changed, the velocity of the picker and consequently the kinetic energy of the shuttle at the time it leaves the picker will not change. With a long lug strap, the shuttle must have a greater velocity at the time it

*The correct definition of power is "the rate of doing work" but in connection with weaving, it is interpreted to mean the kinetic energy of the shuttle causing it to pass from one box to the other. The writer has used the word here as it is used in connection with loom fixing.

leaves the picker in order to retain sufficient kinetic energy at the time it enters the shed, to carry it to the other box in time to prevent the loom from banging off.

The timing of the pick can be changed in the following ways:

1. The angular position of the cam "h" on the cam shaft can be changed.
2. The length of the lug strap "d" can be changed.

In order to properly time and set the pick of a loom, it is necessary to have the various adjustments made correctly relative to each other. To properly time and adjust the pick, proceed as follows: Loosen the cam "h," Fig. 1, on the cam shaft. Move the cam longitudinally until the side of the cam and cone nearest the center of the loom are flush when the cam is at its greatest throw. Tighten the cam temporarily on the shaft. When the cam is at its extreme throw, adjust the bearings carrying the shaft "k" so that the face of the cone rests on the cam through its entire width. Adjust the lug strap "d" so that the end on the picker stick "b" is a little higher than the end attached to the arm "g." Turn the cam shaft until the cam is at its greatest throw and adjust the length of the lug strap so that picker stick "b" will clear bumper "l" by from ½ inch to ¾ inch. Loosen the cam on the shaft again and turn the crank to the top center or a few degrees beyond. Turn the cam on the shaft until all of the slack is out of the lug strap and the loom is just ready to start to pick. Tighten cam in this position. Adjust and time the opposite cam and pick in the same way.

Now start the loom and put a hand on the check strap to feel the force with which the picker stick strikes the strap when the shuttle goes home in the box. If it strikes a hard, sharp blow it shows that there is too much power, while if the shuttle does not reach the box in time to prevent the loom from banging off it indicates that there is not enough power. If there is not enough power, lower the lug strap on the picker stick and adjust the length of the lug strap so as to time the pick at the proper time. Be careful not to have the end of the lug strap on the picker stick much lower than the end attached to the arm "g" or the strap will pull up on the stick and the loom will not pick satisfactorily.

On some looms the length of the arm "g" is adjustable. In this case, when it is desired to give more power to the loom, "g" is lengthened and the strap "e" on the picker stick is lowered, the lug strap "d" being kept level at all times. After changing the position of the lug strap on the picker stick or the length of the lug strap, it is always advisable to pick the loom over by hand to see that the picker has the proper throw. Occasionally it is impossible to get the required power by adjusting the lug strap. It is then necessary to change the position of the cam on the shaft. If the cam is moved nearer the loom side, more power is imparted to the pick, while if it is moved away the power is decreased. Always, after changing the position of the cam on the shaft, the position of the shaft "k," Fig. 1, should be adjusted so that the cone will lay flat on the cam when the cam is near its extreme throw. The throw of the picker and the time of the pick should also be checked.

Before adjusting and timing the picker motion, it is always best to see that the reed and boxes are properly lined up, that the shuttle is boxing properly and that the presser springs are set with the proper tension.

The rule usually given for timing the pick is to have the crank on top center when the pick starts. In many cases the loom will run better if it picks a little later than the top center. If the cloth is very wide for the loom, a late pick gives the shed more chance to open before the shuttle enters and in some cases will stop selvage ends from breaking out. Lenos will weave much better with a late shed as the shed has a chance to form more perfectly before the shuttle enters. In either case the pick may be retarded from 10 to 20 degrees.

Placing a New Picker on the Picker Stick.

Before placing a new picker on the stick, insert a shuttle in the box and force it out by the aid of the picker stick. Note the path of the point of the shuttle as it moves forward. It should travel in a plane parallel to the reed, perpendicular to the lay and passing through the center line of the slot in the lay. If it is found not to follow this line, the box should be adjusted.

First trim the bottom of the picker with a sharp knife until the back side of the loop will line up with the front of the picker stick when the picker stick rests against the check strap and the bottom of the picker rests on the bottom box plate. Drive the picker onto the stick until it clears the bottom of the box by about 1/32 inch. Place a shuttle in the box and mark the place where the point comes in contact with the new picker. About 1/32 inch above this point cut a small conical hole to engage the point of the shuttle. Pick the shuttle forward by hand and watch the travel of the end which is in contact with the picker. It should not be forced against the bottom of the box at any time and should not be raised away from the bottom more than 1/32 inch.

Some fixers claim that the end of the shuttle being acted on by the picker should be raised away from the bottom of the box, at the time the shuttle leaves the picker a distance equivalent to ¼ inch per foot length of shuttle. The writer has obtained better results by raising the point of the shuttle such a small distance that it is hardly perceptable. In no case should the picker press down on the point of the shuttle as this will throw the point that is entering the shed up and is apt to throw the shuttle out of the shed. On the other hand, if the point being acted on by the picker is raised much, there is a tendency to force the point entering the shed down on the race plate. There is a space between the bottom box plate and the race plate and if the shuttle hugs the race plate too tightly when it crosses this space, it may rebound and in some cases be thrown out of the shed. This is more apt to happen at high speeds. In no case should the shuttle raise enough so that it will press against the top of the box. This condition is illustrated in Fig. 5, and if it exists more power will be required to pick the shuttle across the loom, the shuttle will become worn from pressing against the top of the box and if the goods being woven are wide for the loom, selvage ends are apt to be cut from being pinched between the shuttle and race plate.

Boxes, Protector Motion, Reed, etc.

The first thing to do is to line up the reed with the boxes. Provide a straight edge long enough to reach from one box to the other. When this is placed against the back box plates it should lay perfectly flat against both and should clear the reed by not more than 1/32 inch. In case the back box plates are out of line with the reed or each other, they can be lined up by shimming in back

of them with paper or thin pieces of card board. The reed may be square with the race plate or it may make an angle of a little less than 90 degrees with it. In no case should the top project beyond the back box plates. Some fixers claim that having the reed set so that the top projects toward the shed farther than the bottom tends to hold the shuttle down to the race plate and keep it from flying.

It might be well to mention here that great care should be taken when putting a new lay in a loom, to have the slot for the picker stick the proper distance from the

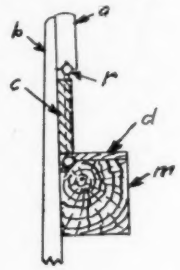


Fig. 2.

back box plates and to have the race plate in the proper position. Referring to Fig. 2, "a" is the reed cap, "r" the reed, "c" the back box plate, "d" the race plate, "m" the lay and "b" the lay sword. A templet should be provided as shown in Fig. 4. "A" is a flat steel plate and "B" is a lug riveted to it that will just fit in the picker stick slot in the lay. The distance "C" is equal to one-half the thickness of a new shuttle. The shape of the templet is such that it can be used for lining up both boxes. Bolt the lay swords and the back box plates in place and insert the templet in a slot in the lay. The edge of the plate "A" should line up with the back box plate. If it does not, the lay should be gained to bring the box plate closer or the lay sword should be shimmed out to carry it back

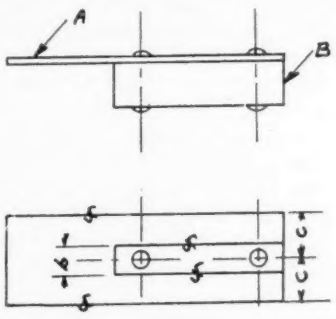


Fig. 4

farther. A straight edge should be placed across both box plates to make sure that they are in line. The race plates should next be screwed in position, having been first drilled and countersunk. See that the edge of the race plate that presses against the reed is absolutely straight. Place the race plate so that the edge next to the reed projects about 1/64 inch back of the front face of the back box plates "c." Put a reed in position and tighten the bolts holding the reed cap. The top of the reed should not extend into the shed beyond the back box plates and should not be more than 1/64 inch back of them at either end. In case the top of the reed does not come in the right position, the reed cap can be relieved slightly or a shim can be placed between it and the lay sword. In case it is necessary to shim it out, it is a good idea to glue the shim in place so that it will not get lost when the reed cap is removed.

The bottom box plates should next be screwed in place and should line up perfectly with the race plate. They may be a little higher than the race plate, say, 10/1000 inch, but they should never be lower and they should be perfectly parallel with each other and with the race plate.

Adjusting the Boxes and Binders.

Place the shuttle in the box and adjust the front plate so that it is parallel with the reed and the shuttle has about 1/16-inch clearance between the back and front box plates. After the front box plates are set, the shuttle should be placed in each box and the binder fingers set so that the dagger will clear the frog by about ¼ inch. The shuttle should then be romeved from the loom and the loom picked over to see that the dagger engages the frog. The binder springs should then be set so that the binders press gently against the shuttle when the shuttle is in either box. If the shuttle rebounds, be sure that the pick does not have too much power, before putting more tension in the binder spring.

Filling Fork Stop Motion.

To set the filling fork, first bring the lay forward to the full throw of the crank with the shuttle on the filling

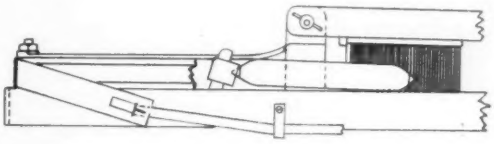


Fig. 5

fork side of the loom. Loosen the filling fork cam on the shaft and turn it until it just starts to move the finger. Tighten the cam in this position. Next loosen the bolt that holds the finger and move the finger until it clears the hook on the fork ⅛ inch or 3/16 inch and tighten in this position. Start the loom and watch the action of the fork. If the finger engages the fork before it swings clear, retard the cam slightly. If the hook on the fork drops back before the finger gets out of the way, advance the time of the cam. Always be sure that the tines of the fork clear the grate and when the lay is brought forward to the full throw of the cranks, the tines should project through the grate about 1/16 inch. Also be sure that the tines clear the lay when the fork swings way back. It sometimes happens that if the times are shortened to make them clear, the filling will catch under them. For this reason it is usually better to cut the notch in the lay deeper than it is to shorten the tines.

Setting and Timing the Shed on Cam Looms.

The shed should be set so that the ends next to the selvage, in the bottom shed, clear the race plate by about 1/32 inch when the harnesses that are up are at their highest point. The height of the shed should be such that the cloth will weave and break out the fewest ends of

warp. In some cases it is best to have the shuttle just clear the top shed while other times fewer ends will be broken out if the shuttle presses lightly against the top shed. Two or three harness work will usually stand a deeper shed than when five or more harnesses are used. The height of the shed can be changed by changing the position of the stirrups on the levers.

The timing of the shed depends upon the character of the weave, the firmness of the cloth and other conditions. If the cloth is very closely woven, the loom will weave much better with an early shed. If the sley and picks are light, the filling will be beat up more evenly and the cloth less apt to show reed marks if the shed is timed late. A late shed also gives a better cover to the cloth. There is no set rule for timing the shed. The most satisfactory results can be obtained by trying different timings for the cloth to be woven.

A high breast beam and whip roll give better cover to the cloth by causing the top shed to weave slacker. With only two harnesses this can be carried quite a ways but when many harnesses are used and the whip roll is raised too high, the ends drawn through the back harnesses are apt to weave slack in the top shed and either weave under or break out.

Let-Back Motion.

Most looms are provided with some form of let-back motion, which allows the take-up motion to let-back a few picks when the filling breaks to compensate for the picks taken between the time the filling breaks and the time the loom stops. The way in which it operates is as follows: There are three pawls working on a ratchet. One is worked by a cam on the cam shaft and turns the ratchet one notch every second pick of the loom. A second pawl engages the ratchet and keeps it from turning after it has been turned forward by the first. The third rests on the ratchet but is slotted at the point where it is pivoted so that it only engages the ratchet when the second is thrown out of operation. If the second is thrown back, the third holds the ratchet after letting it back the length of the slot. The length of the slot is usually governed by a set screw so that the number of picks that the loom lets back is adjustable. The second pawl is disengaged by the filling fork when the filling breaks or runs out.

This motion is very simple and all looms with ratchet take-up should be provided with it. When changing a loom from one style to another the let-back motion should be tried to see that it works properly and lets back the right distance. Some fixers, when changing over from one style to another disregard the let-back motion and leave it to the weaver to let back the required number of teeth when the filling breaks or runs out. Weavers who are very skillful can do this with little effort but many are apt to make thick and thin places. It sometimes happens, when the let-back motion is functioning properly, that the filling will break and catch again in the shed before the filling fork operates. A thin spot is then inevitable. This, however, occurs rarely and in nine cases out of ten a let-back motion that is functioning properly will prevent thick or thin places.

Shuttles.

It often happens that a new set of shuttles are placed in a loom and given no care whatever, unless they give trouble, until they wear out. Shuttles should receive careful attention, both to prolong the life of the shuttles and to improve the weaving of the loom. This is especially true when looms are run at high speed. When putting a new set of shuttles in a loom, they should be gauged to make sure that they are of the same thickness and they should be weighed to see that there is not much difference in the weight. They should be carefully sandpapered to make them smooth and the curved surfaces at the shoulders should be smooth and gradual. Any sharp projection can be felt by rubbing the hand over the shuttle. The place where the metal of the point comes in contact with the wood should be absolutely smooth, as a very slight projection of the wood at this point will chafe the warp and break out ends. When the points of a shuttle are placed between the hands and the shuttle spun, it should stop with the face that is grooved down. Having the face that is nearest the fell of the cloth heaviest tends to keep the shuttle from turning in the shed.

Shuttles should be inspected periodically. If they show much wear, they should be planed to the same thickness and the bottoms should be straightened. The latter is very important as a shuttle with a rounded bottom will be thrown out of a straight line of travel through the shed and will place unnecessary friction and strain on the warp. Shuttles should be occasionally oiled with light machine or boiled linseed oil. After oiling they should be allowed to stand for a short time for the oil to soak into the wood and then wiped with a clean piece of cloth or waste until all oil left on the surface is removed. The oil keeps the grain of the wood from opening up and lubricates the shuttle so that it will pass along the reed with less friction. Spindle pivots and springs should be oiled with a few drops of oil once a week. In order to obtain the maximum life of a shuttle, the reed race plate and boxes must be properly lined up and the loom must have no more power than is necessary to keep it from banging off.

Dobbies.

There are usually more harnesses used with dobbies than with cams, there are more parts to get out of order, the ends of warp in the various parts of the pattern often weave with different tension and if the weave is at all complicated, dobbies are more apt to give trouble than cam looms. For this reason too much care can not be taken with looms equipped with dobby heads.

When fixing dobbies it is well to remember the following points which apply to double index heads.

1. The shuttle should always move in the same direction as the bottom knife, just following that knife.

2. The top row of pegs in the chain work the bottom latches, and the bottom row, the top latches.

3. On a right hand loom, the outside peg works the bottom latch to open the shed for the shuttle to be picked away from the head.

4. For a plain selvage with selvage ends in the two front harnesses, a chain bar on a right hand loom has a peg in the outside top hole. A left hand chain has a peg in the bottom outside hole.

5. When either knife is at its extreme throw, the points of the latches should not clear the edge of the knife by more than ¼ inch.

6. The shed should be timed so that the harnesses are level when the reed is the same distance from the fell of the cloth on both picks.

Let us first assume that a new head has been placed on a loom and is to be started up. If the dobby rocker arm is

driven from the cam shaft, place the shuttle in the box on the filling fork side of the loom. Turn the loom over until it is ready to pick and turn it back to bottom center. Place the rocker arm in a horizontal position. With the carnk arm that drives the dobby loose on the bottom shaft, bring it to front center. Tighten the crank arm on the shaft in this position and adjust the crank arm and rocker arm to any convenient length. Attach the connecting rod between the rocker arm and crank arm adjusting the length so that it will reach between them when the rocker is horizontal and the crank is on front center. Turn the loom over by hand until one knife is way in and the other way out. Adjust the knife that is way in so that the points of the latches clear it by about 3/16 inch. Turn the loom over one pick and adjust the latches as before. Place a chain on the cylinder and turn the loom over slowly by hand, watching the knives and the levers to see that neither strike the dobby frame. If the throw is great enough so that either knives or levers strike, some part of the dobby is apt to be broken. Next set the harnesses and turn the loom over until the ones going up and coming down are level. Measure the distance from the fell of the cloth to the reed. Pick the loom over once and with the harnesses level again measure the distance. If the distance is not the same on both picks it can be made the same by changing the length of the connecting rod and adjusting the position of the knives relative to the latches. After timing the shed so that it is the same on both picks, turn the loom over until the top shed is at its highest point and insert a shuttle. The corner of the shuttle away from the reed should just touch the top shed. If the shed is too low either lengthen the crank or shorten the rocker arm. If too high, vice versa. Always adjust the position of the knives relative to the latches after changing the length of their throw. No fixed rule can be given for the height of the shed. It can best be determined for a given style by experiment. A style that requires but few harnesses will stand a deeper shed than one that requires many harnesses.

The timing of the shed depends upon the firmness of the cloth, the character of the weave, the cover desired and other conditions. A late shed gives better cover. With light sley and picks, the filling will beat up more evenly and reed marks will show less with a late shed. With a close weave and heavy sley and picks, the loom will weave better with an early shed. An early shed helps to eliminate bumping or pulling the cloth forward when the lay beats up.

Setting the Harnesses.

First, place the saddles on the levers in the proper notches. Starting at the front, place a given number, usually three or four, in the bottom notch, then the same number in the second notch, etc., until all of the saddles are on the levers. The arrangement of the saddles on the levers depends upon the design of the dobby. The rocker arms on the back of the dobby are longer than those on the front so that the back ends of the knives travel farther than the front ends and the back harnesses are consequently raised higher. The number of saddles that should be placed in corresponding notches on the levers depends upon the difference in length of the rocker arms. Many dobbies weave best with four saddles in corresponding notches.

Next tie in the warp and hook up the springs. Sight from the top to the bottom hooks to which the steel shafts are to be fastened and part the warp at these points. Hook the shafts over the hooks. With all the harnesses down, adjust the length of the straps on the selvage harnesses so that the selvage ends will just clear the race plate and adjust the length of the other straps so that the tops of the steel shafts that carry the heddles form a flat surface sloping slightly toward the back of the loom. Pick the shuttle across a few times by hand and start the loom. After it has woven for a few minutes, stop the loom and pick it over one pick at a time, examining the shed after each pick. If the ends through the back harnesses weave slack in the top shed it can be remedied in the following way: Drop all of the harnesses, lengthen the straps on the back harnesses and line up the steel shafts as before. If they weave slack in the bottom shed, raise the back harnesses.

Sometimes, because of design, some ends tend to weave slack and give trouble by weaving over or under and breaking out. Some fixers put in extra lease rods to do away with this trouble. These rods do but very little good unless one is put in directly back of the harnesses for the purpose of depressing certain ends that weave slack in the top shed or raising ends that weave slack in the bottom shed. It is sometimes possible to rearrange the lease so that the same results can be accomplished without putting in a third rod. The writer has fixed looms that have given trouble by ends weaving slack where four lease rods were used and the back harnesses raised an excessive distance to overcome the difficulty, by removing two of the lease rods, dropping the back saddles on the levers and timing the shed earlier. After making these adjustments, no more trouble was experienced from slack ends. The back harnesses were raising so high that these ends took all of the strain and left the ends through the front harnesses slack. The early shed may or may not have had anything to do with slack ends but the cloth was closely woven and timing early eliminated the give and take of the cloth when the lay beat up. It sometimes happens with old dobbies that some latches are longer than others. Pick the loom over one pick at a time and raise the harnesses to their highest lift each time. Sight along the tops of the frames and if any are below a straight line drawn through the tops, it indicates that the latches which are raising those harnesses are long. Raise the saddles on the levers where the harnesses are low, then drop all of the harnesses and reset them. This should be repeated for each pick until a perfect setting is obtained.

Whip Roll and Breast Beam.

The position of the whip roll and breast beam depend upon the character of the cloth and the cover desired. For low count cloth woven with few harnesses and for satins where good cover is desired a high whip roll will give best results. When many harnesses are used, the whip roll must be set lower to keep the ends through the back harnesses from weaving slack in the top shed.

Leasing.

The lease for a given weave can best be laid out from the harness draft. It should be so arranged that as few ends as possible will pass together over or under a rod. In some complicated designs, it is impossible to have all of the ends separated by two rods. All of the ends can usually be separated by putting in another rod but three lease rods are objectionable.

Mispicks.

Mispicks are caused in many ways and are sometimes

hard to locate, especially when they do not occur frequently. The first thing to do is to locate the mispick in the cloth with a pick glass and find which harness is causing it. If the filling is picking over once in a repeat of the pattern, look for a short peg or a peg out of the chain. If it is picking under once every repeat, look for a peg that is driven crooked so that it raises two fingers instead of one. If the mispicks occur irregularly, look for the following causes: Latch not bent down far enough to engage the knife, latch not bent up far enough so that it will always clear the knife when raised, latch rubbing on the grate, rivet and hole worn badly in jack where latch is pivoted, jack bent so that it strikes one adjoining and holds the harness up, cylinder bearings dry or binding so that the cylinder does not turn every pick, cylinder so located that it does not bring the peg in line with the finger. If the hook on a latch is short and the point of the latch clears the edge of the knife by an inch or more when the knife is at its extreme inward throw, the cylinder will turn enough before the knife reaches the latch so that a peg will let a finger drop before the knife engages the latch and the harness will stay down.

Lenos.

Marquisettes or lenos are very difficult weaves because of the ends crossing each other and the extra strain put on the warp thereby. There are so many different ways of weaving them and so many extra appliances are required on a loom, that it would take a very long article to cover the subject thoroughly. The few remarks given here apply to lenos woven with steel doupes and heddles.

Before a fixer changes a loom over to weave leno, he should go over it to make sure that it is in good mechanical condition. Crank arms should be tightened, all worn parts in the dobby and its driving mechanism should be renewed, all latches should be the same length from the jack to the hook on the latch, there should be no play in the bearings that carry the lay swords, there should not be an excessive amount of back lash in the gears on the crank and cam shafts, the shed should be timed alike on both picks and the dobby gone over to see that the knives are properly set and that the hooks on the latches are bent to the right height. The boxes should be lined up and new shuttles provided if the ones in the loom show any appreciable wear.

A fixer who has had experience with lenos should put in the sample warp and he should be given time to fix the loom so that the best results possible will be obtained. After enough cloth has been woven so that it is definitely determined that the loom is weaving satisfactorily, the following measurements should be taken and recorded to be used in starting other looms on the same style.

1. Height of whip roll and breast beam. This can be determined by placing a straight edge from the whip roll to the breast beam and measuring the distance from the bottom of the straight edge to the top of the race plate when the cranks are on their back centers.

2. The angle of the cranks at the time the pick starts. A fixture like the one shown in Fig. 3 can be used for this purpose. Turn the loom over until it just starts to move the shuttle in either box. Place the fixture on the floor and adjust the arm "K" so that it lies flat against the side piece of the crank. Turn the loom over one pick and try it again. If the crank is not at the same angle for both picks, the timing should be changed so as to bring it the same.

3. The distance from the reed to the fell of the cloth when the harnesses are level. This can be determined by picking the loom over by hand and measuring the required distance. This should be done after picking the loom from each side to make sure that both picks are timed the same.

4. The travel of the easer bar. The travel of the easer bar can be determined by measuring between the whip roll and the easer bar with a pair of inside calipers. While this may not give the true travel of the bar, it will give fairly accurate results if the fixer is careful to locate the easer bar each time in approximately the same position, relative to the whip roll.

5. The lift of the jumper harnesses. The lift of the jumper harnesses can be determined by measuring the distance from the top of the jumper harness to the top of the adjoining harness, when the jumper harness is up and again when it is down.

6. The height of the shed. This can be determined by placing the cranks on the back center and measuring the distance from the top shed to the race plate or by placing

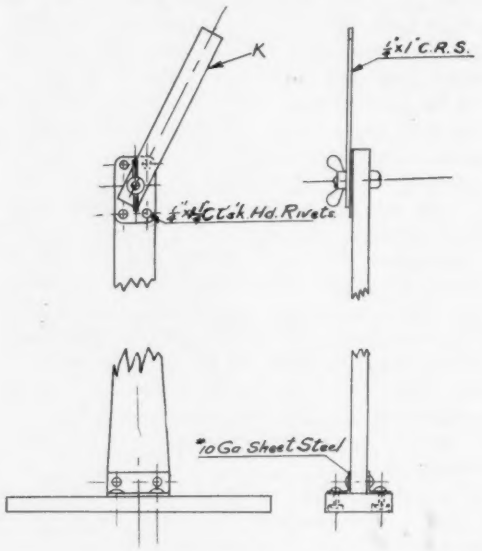


Fig 3

a shuttle in the shed and noting the position of the corner relative to the top shed. The height of the shed should be measured with the loom picking from each side in order to get the height for both open and crossed sheds.

The following suggestions apply to lenos in a general way:

1. The pick should be retarded about 15 degrees from the top center.

2. The jumper motion should be timed early enough so that the standard ends are way down when the shuttle enters the shed.

3. If the crossing ends are carried under a rod in the rear of the back harness, and are not raised on open shed, the easer bar will require but little travel. In some cases it may be used simply as a vibrator with a spring attached to the lever.

4. The tension on the warp when weaving lenos, makes a great difference with the way they weave. Have just enough tension in the yarn to keep the ends from weaving slack.

Scientific Trends with a Textile Slant

Service Records.

Forty years with one company and at the age of seventy its chief engineer is a record which bespeaks more than the usual advantages to a company represented by low turnover. When the relation between owner and producer becomes so stabilized that the detailed benefits of a long period of experience are all concentrated upon the upbuilding of one institution, that corporation possesses special competitive advantages over its fellows. Needless to say, the rise in status of the employee must have been merited,—in a way the institution that has made it possible to achieve such a rise is unusually stronge in basic, fundamental elments of management and deserving of special mention.

The distinguished English chemist who opened our recent convention of the Chemical Society has given us plenty to think about and a guiding principle upon which to base our future policy of conducting business. It is no less than the obligation to think in keeping with the point of development to which civilization and progress have advanced in scientific matters, lest failing to do so we become unworthy and unable to take part in the game of life that is being played, and of a spiritual dullness incapable of more than material absorption of the advantages of progress.

Our well-known engineer has aptly pointed out to us the advantages that must accrue to everyone from the conduct of affairs by the creative, developing types of minds, the "Fifth Estate of the Realm."

Speaking from a hope for the development of all mankind we should say that our efforts ought to be concentrated along lines of increasing the number of this Fifth Estate, for we do not, this soon, forget the lesson of Junker exploitation of an entire people. Safety lies in increase and development of the intelligent rather than too early reliance upon the present small group of them for the conduct of our affairs. In a moment of enthusiasm and a cynical reaction to the political events of a day we might be tempted to subscribe to such a policy as group control, but are still too close to realization of the dangers of irresponsible control of public resources by a small group, even in our own Washington.

Many a business can point to long-term employee records but how many can add that these men occupy the leading positions available? The instance above is accompanied by productions incorporating the highest order of engineering skill. All of which reminds us of the ablest mill engineer we have ever known,—a carpenter, first, and a carpenter's son, rising by merit to the highest station within the gift of the organization.

So many occasions arise, during the years, when even with the proper intentions differences and friction cause breaches to be made and to widen. Patience and quiet-minded adherence to an objective and an ideal are so necessary on both sides. The idea that some of the "old order" have, that a brilliant man just can't help doing what he wants to and will do it in spite of conditions opposed to him, is obsolete to modern thinking. We are all human, with the urge of life and its benefits, and will get those benefits, at any initial sacrifice.

Speaking economically, also, we are of the opinion that we have seen the rise of the last great fortune to be made openly in this country, even on so small a basic unit as pennies, nickels or dimes, on the basis of payment for employees that forbade a single one of the rank and file to exist in decency. We have much to be thankful for and hopeful of industry that not a single cotton mill in the United States has had to exist and "prosper" on that basis.

Safety.

(*"Il est defendu de se pencher au dehors."*)

An American doughboy in a French hospital explained that he got there all on account of that sign—he looked out of the window to see what was "dehors" and nearly lost his head against a post.

I am afraid a whole lot of effort in Safety programs in mills is being wasted in the same way this sign was wasted on that beginner in the French language.

The Christian Scientists have done us much good by pointing out that no good comes from flaunting ugly pictures and other reminders before us of hurtful and painful or disgusting facts, but that these, indeed, tend to set up influential images of them in our minds that react harmfully. It is too bad that we have not carried the thought along through the further step suggested by this idea until every attempt at *training* in desirable habits be based upon careful analysis of what we should do and then properly developed steps leading up to how to accomplish that in the most effective way.

Our criticism of a great deal of the bulletin instruction on safety observed in mills is that it is incomplete, the work of novices instead of application of closest study of the individual needs of the problem to the temperaments of the people whom it is intended to help. And then it should always be so put in front of them that it becomes, not once, but all the time, "the arresting idea" to them.

Pick a safety man for his combination of:

1. Knowledge of human nature.
2. Ability to master technique of work-operations and machinery.
3. Knowledge of the principles of poster-display and display advertising.

The Trend Toward Fineness.

An obscure figure of recent census data shows more about the situation regarding public appreciation of and demand for finer things than all the negative arguments of the producers of shoddy.

The sale of artists' materials increased more than twenty-four per cent in the United States last year.

The very least disposal of that statement is to say these materialts went to amuse the children. I hope they did, but I know they didn't. New York's leading department store featured them in advertising and several stores of name and fame added or built up departments to carry an additional line of them. Hard, practical materialists, your department stores, giving little attention to back numbers, but taking all chances on meeting the trends of the times.

To the student of social conditions this is a very hopeful sign,—to the textile manufacturer of one type it is the same, and to all textile manufacturers it contains a warning. Meet the demand that is developing under our very eyes or be content to sell a few odds and ends when the real volume of sales is taken care of by the people who take advantage of this demand and produce to it.

The venturesome few who are starting finishing mills and specialty goods manufacturing in the South have the world of opportunity before them, and little to fear beyond their own limitations. We suspect that the same spirit which made them venture in will exhibit little of the quality

of limitations.

Specialization.

Should a business presume to develop and specialize brilliant men and women solely for their own uses, especially if these uses be so restricted by the demands of the business as to practically assure that long continuance along their lines will isolate the individual following them from the usual opportunities of competitive enterprise?

If the business is a great institution, covering far-flung projects and remotely-bearing subsidiaries, it offers as great if not a greater opportunity for development of the individual as would his activities scattered among an unconnected group of industries. He would have the advantages of acquaintance and the ordinary benefits of association, intimately, with a group who understood his personality and appreciated the extent of his ability. If it is a strictly specialized business nothing but speculative rates of return for his services are tenable. There is much more than the element of fairness involved in this.

Despite much argument along these lines it is not the terribly serious matter the unions would have us believe to train men to be drillers, planers, carpenters on rough sawing, etc. All these can be used to advantage in more than a thousand different industries and they are rather fortunate men who have such a wide divergency of potential market. But train a man for personnel specialist or quality-inspector and you narrow the field somewhat, because it is a considerably smaller number of firms that can use or afford them, necessary as they are to big business. When you make a man a visualizer of advertising copy you have indeed, created an unique individual, although he is a life-saver in certain functions of business.

Versatility is the highest order of merit for which adaptation should be rewarded in medium-sized institutions,—when special abilities of an even highly-versatile assistant are required the utmost care should be taken to see that:

1. Too great a proportion of his energy, in terms of what he is worth, is not spent upon the special task.

2. That the special task be approached with such adequate planning as to insure that the desirable, versatile man is not lost to versatility—nor to your business.

Where the Future Lies.

We are hearing so much about research for the textile industry and so great an effort is being made to woo all factors to the support of the program, which should have been undertaken long ago, that we ought to take stock of each idea presented to the forum of textile manufacturers it is designed to help.

Above all things, let us have any research work we may do a means to the end of lowered costs with better productions or all our teaching is vain "and your faith also is vain." To that end admit no programs unless aligned to a practical problem requiring solution, but having done this much do not hesitate to invade the very depths of abstract science to secure the tools to accomplish what you are after.

It is certainly true that the future crown of outlets for manufacturing will go to the group that is sufficiently behind the research to carry it on with confidence. It must also be done with skill. Why should one *section* or another be urged to take the leadership. All should join this program but we sincerely trust the canny spirit behind the conduct of southern business to insist upon research as a means to an end instead of merely the end of "having a big research program." In many such, to quote a famous line, the future just "lies and lies and lies!"

Effective Work.

"Four must start that one may arrive."

The French have a way of putting out an idea in a terse form that sticks in the memory. Another feature about it is that it is applicable to a wide range of operations.

If you study all human accomplishment and development you will realize, more and more, how great a volume of effort is actually made for each definite, useful, result produced. Just as a great volume of effort is necessary in a garden in order to bring forth a relatively small volume of perfect fruit so must valuable research products come forth from a proportionally large volume of correlated endeavors. The chief reason is that you must be sure that the work which *looks* effective is not incomplete or subject to modifying influences of some branch of science you have failed to investigate the influence of on your problem. That is why dyestuff research chemists invade the fields of biology, physics, colloid chemistry, etc., before they form their final conclusions.

All such factors must be included as branches of any project of research on a large scale, to safeguard the investment. The message your scientist will bring out from the realms of his abstract field must be completely safeguarded by the protection and support of enough auxiliary forces to guarantee its sure delivery, and the solution of the problem.

The General Coal Company, 615 Johnston Building, Charlotte, N. C., are the exclusive sales agent for the Stonega Coke and Coal Co., and the Hazle Brook Coal Co., handling anthracite and bituminous coals. They are successors to the business of Wentz Company. J. O. Smith is southern sales manager, and G. D. Kilgore is assistant to Mr. Smith at the Charlotte office.

"Starches—their Fluidity and Viscosity in Relation to Sizing Value for Textiles," by Walter A. Nivling, consulting chemist, is the title of a recently published book of interest to weaving mills.

Mr. Nivling, it will be recalled, addressed the National Association of Cotton Manufacturers on this subject at a recent meeting, and his remarks at that time have been elaborated on and published in this book.

The volume is profusely illustrated with photomicrographs of various starches and size materials, as well as of their effect, shown by views of yarn to which they have been applied. An addition of interest are the illustrations which show various testing devices, these and their operation being properly described. The ten chapters in the book deal with the subject from all angles, treating with the composition of starch granules, penetration, advantages of thin boiling starch, sizing compounds and softeners, mildew, effect of method of preparing and using starch on results, and other important features. The book contains 82 pages, and is issued in a convenient size, 7 x 4¼ inches. The price of the book is $1.00, and copies may be secured from the publishers, The Barr-Erhardt Press, Inc., 205-209 West 19th Street, New York, or by writing direct to the author, Walter A. Nivling, 73 Tremont Street, Boston, Mass.

What Other Men Manage With

BY R. A. SONIAMAN.

Anent the Fly Frames.

Of late years an expression has become current that one gets out of a thing only what one puts into it. Changing this a bit: to get the full benefit of a trip to another mill, the visitor must be primed to the brim with questions that touch on every phase of the interesting subject of cotton manufacturing. From these queries come the mass of reactions from which must be culled those facts that may be used advantageously.

Being aware of the truth of these assertions, it is only natural that when John Doe, whose speeders are all of one make and vintage, is invited by Dick Doe to look over his shop, in which there are all varieties of fly frames, American and English, that John will be anxious to learn whether the English frames and also the other makes are as good, better, or worse than his own. And in what way—evenness of work, upkeep cost, production, facility in handling, labor cost, and so on.

Types of compounds, their good and bad points; builder motions and their effectiveness; electric stop-motion advantages versus no stop motion; self-weighted against

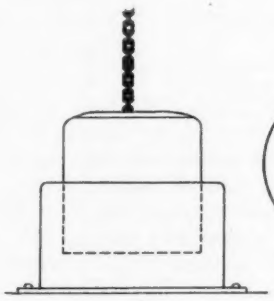


FIG. 1

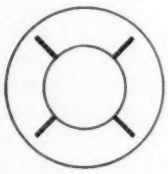


FIG. 2

weighted top rolls; self-balanced rails compared with the ordinary kind; the style of creels, also whether wood or metal; the types of flyers—all these and more will come in for discussion.

"Rubber-covered top rolls, eh!" remarks John with interest, "how do you like them?" "We've only got a few," Dick replies, "and we haven't had them on long enough to get an idea of how they'll stand up."

"By the way," John stops at an English speeder, "what's the idea of those guards at the builder motion?" Fig. 1.

"Oh, I found that we had a little trouble when a hard object of any kind got under the weights of the builder motion, so I had those guards made up. They do the trick all right."

"Well, that's a tip worth knowing even if I don't have any English speeders just at present," John reflected.

"Here's some dope I had handed me from a man who had been visiting southerly located mills," and Dick pointed to a half dozen spindles whose flyers had four nicks cut in them like the illustration, Fig. 2.

"What's the idea?" asked John.

"Well, it seems that the chap who worked it up had an idea that if he could retard the twist sufficiently to carry it to the bite of the front rolls that there would be less breakages."

"And do you find it so?" John's interest was aeroplaning.

"To tell you the truth, I've only had these few nicked the other day, and it's rather early to say anything positive about them. The section hand says that he can't see any difference in the running. But you can try out the idea on your own speeders, Jack."

The eternal cone belt came in for a talking over. Dick is rather pleased with the type of belt that is a compound of two belts—the narrow strip A, in Fig. 3, running on the cones being attached to a wider strip B, that serves as a reinforcement. John thought that there was hardly enough flexibility to the belt, and said that he had been very successful with a rubber belt. Obviously, a discussion on the shape of the cones was inevitable, both agreeing, however, that there was little choice among the several makes on the market.

That frequently recurring bone of contention among old-timers—bobbin versus flyer lead—was amicably bridged over by old-timer Dick gracefully acknowledging that "since the majority seem to think the bobbin lead is more adaptable, taken all in all, than the flyer lead there must be some foundation to it."

Having gone over the mechanical differentiations of the several makes of speeders, the organization is looked into. John wants to know how Dick gets his twist multiplier.

"We made a series of tests on the speeders, and also on the spinning frames," Dick answered. "We tried various multipliers and finally settled on one that showed the least breakages. For instance, if we found that the results were something like this:

Twist Multiplier	Breakages on Fly Frames Front of Roll	Breakages on Spinning Frames in Creel
.45	20	18
.50	15	14
.55	10	8
.60	5	4
.65	3	2
.70	2	1
.75	0	0
.80	0	0
.85	0	0

we felt that a multiplier of .70 or .75 would be about right. At .65 or lower, the breakages would counteract the greater production expected; while at .80 or over production would suffer, and the chances are that there would be difficulties at the drawing rolls in the succeeding machinery. And even if there was no such trouble, the harder twisted roving would tend to crease the top rolls much quicker than softer-twisted work.

The drafts are next discussed, and John is surprised to find that Dick is a long draft advocate on speeders. "For my particular class of work, it can be done," reiterated Dick, "and we take advantage of the fact. Why shouldn't we? We get a bigger production, the frames run well, the help have no fault to find. It would be a bad mistake on our part to do otherwise." And then he continued, "but of course, I have no objection to the short draft, where a

short draft has something to commend it."

One naturally expects that John will ask if Dick can maintain the balance between the various processes of fly frames. Also for the production per spindle on each process. Are the speeder tenders on piece work? If piece, by the clock or pound? If paid by the hank, has it ever been discovered that the workers are manipulating the clocks? And what has been done to overcome this?

Speeds are next brought up—spindle and front roll. John asks Dick if he runs at machine builder's catalog speeds. Dick smiles.

"We're from Missouri in this mill. We've got to be shown that the spindle speed we run at is the best suited for our class of work. How do we find out? By running a series of tests."

Setting of rolls is always a live topic, particularly in view of the interest in self-weighted rolls. The writer was once amused at the discomfiture of a carder who had told him how careful he was to have his rolls set a certain distance and then directly in front of him found a machine whose rolls were set anything but that particular distance! Is there any trouble with hard ends? Have experiments

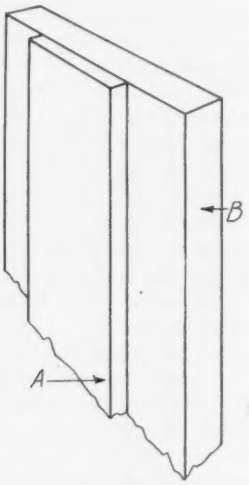


FIG. 3

been made with spreading top rolls just a little more than the bottom ones?

What are the hanks running on the various speeders? How many yards are taken when sizing at the different processes? How often are the sizings made? Is every machine sized in turn and is a record kept of the sizings? What are the variations considered permissible? What are the actual variations?

How is the tension? Tight, slack, medium. Who regulates it? Are the section hands allowed to change it whenever they think it advisable?

"Our tension gears are changed only by the direction of the carder. He makes it his business to follow this point up very carefully. Section hands are not allowed to make changes without his permission; however, if a tension requiring attention escapes the carder, the section hands have been trained to bring it to his notice."

"Don't the speeder tenders move the rack if they have trouble with the tension?" asked John.

"I had lots of trouble during the war on account of the help moving the rack, but I don't permit them to do it now. We look over the taper of the bobbins occasionally as they are doffed, and they tell the tale of a manipulated rack as though it were proclaimed from the house tops."

Stretched roving, its causes and remedies obviously are thoroughly talked over; as also are good and bad running work. The proper taper for the bobbins is always worth looking into. The writer has found ideas regarding this subject somewhat divergent. However, all tapers as made today can be put into one of three classes: 1. proper taper; 2. long taper, and 3. short taper. A glance at the sketch, Fig. 4, will show that there is a loss of yardage when the

FIG 4

FIG 5

taper is too long; while, on the other hand, a taper too short is usually the cause of tangled bobbins and consequently, waste. The solid line represents the taper that is probably best adapted for speeder bobbins; the dotted line is that of the taper too short; and the broken line (dashes) is a taper which would be considered too long. The writer has been in rooms where all three of the illustrated tapers were running on one section.

Another point often overlooked is that of the proper length of traverse. Too long a traverse may mean tangled bobbins on account of the roving going over the ends; too short a traverse certainly reduces the yardage on the bobbins. Fig. 5 illustrates 3 types of traverse. Here, again, the solid line is that of what would be considered as being an ideal traverse; the dotted line that of too short a traverse; and the broken (dashed) line too long a traverse.

Another interesting subject is that of piecing. "We try to make our help see that a one-inch piecing is plenty long enough and that it is better for the quality of the work than a three- or four-inch piecing," Dick asserted. Most carders will probably also agree that piecing with wet fingers is a practice which should be prohibited.

What is the opinion on having the bobbins all one diameter in the creels? "Very bad practice," Dick said, "bobbins all running out at one time make it hard for the speeder tenders to keep up with the creeling at certain periods, whereas at other times they don't have anything to do for hours."

It is well to inquire if anything has ever been done in regard to making different allocation of frames per set than the pretty universal one of giving two machines to a worker. Probably the greatest diversity is at the slubber, where sometimes one, sometimes two constitute a set.

Who operate the speeders, men or women? Practice

differs here even among mills in the same locality. Intermediates and roving frames are usually attended by women; slubbers, however, may have men or women. As to the efficiency, the writer has found that on slubbers there is little difference between the two sexes.

Is there a record kept of the single and double? And is it carefully followed up. The writer has seen many a good system made absolutely valueless from the fact that it was not followed up. How the workers are approached when they do have to be told about the imperfect work has a large bearing in the matter of holding it down to a minimum. Many a good worker has been lost to a concern because of the lack of understanding as to how to broach the matter properly to the operatives.

How much doffing do the doffers do? Do they do any work besides doffing? Is there a chance for advancement for them? What of spare hands? "I think spare hands are a mighty important part of the speeder personnel," Dick replied in response to a question of John. "Our system is to teach the most capable doffer every detail connected with speeder tenders work, then put her on sparehand, and when a worker is absent let her run the frames of the absentee. When there are no absentees the regular attendants take turns at going on sparehand, the learner being entrusted with the responsibility of running their frames. In this way the future speeder tender gains the necessary experience and confidence for handling a set of

HKS.	COLORS
8	Red
10	Yellow
12	Blue
14	Green
16	Brown
18	Black

FIG 6

frames, and there is, furthermore, always an efficient worker as spare who can be used to straighten things out here and there on the section."

Have any experiments been made to determine whether two or three wrappings around the presser are the proper thing?

Crayon marks are generally used for distinguishing the different hanks. In what way are the colors kept before the workers so that there can be no chance of wrong marking through a misunderstanding of what the colors really are? One firm the writer visited had boards with the colors painted on it; Fig. 6. The boards were hung in places convenient for the workers to get at.

What disposition is made of the full and empty bobbins? Most mills have bobbin dumps for the full and

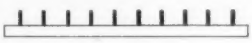


FIG. 7

empty bobbins. There are, however, some concerns which make use of boards—pin boards—for holding so many bobbins, each bobbin being retained individually by means of the wood or metal pin. Such a board is depicted by the sideview, Fig. 7.

The trucks for transportation of the speeder bobbins differ radically for these two types of storage; in the former, the ordinary oblong kind is used, either wood, fiber, or canvas; whereas in the second method, the trucks are of the slide form, into which the boards are pushed, each board being by itself, and can be removed without disturbing its neighbors. See Fig. 8. This system has much to commend it, particularly for the handling of material between the last roving process and the spinning room, because, keeping the bobbins each by itself prevents any damage to the roving, a condition usually existing with the ordinary pack method of storing and transportation.

When a change has to be made from one hank to another who gives the orders and who carries them out? Are the

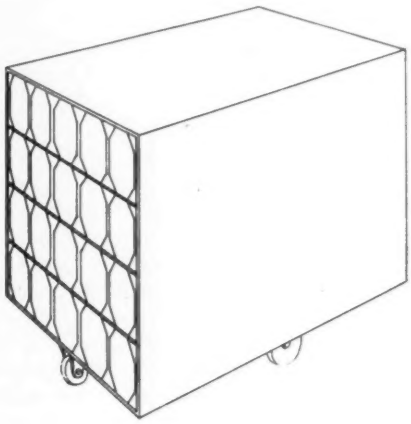


FIG. 8

instructions given verbally or written on paper? A system that the writer has found seems (with but slight variations) to be gaining in favor among the more progressively managed card rooms, is that of attaching a tag, either printed or entirely filled out in ink, to the frame being changed,

HANK	
TYPE COTTON	
TWIST	
DRAFT	
TWIST GEAR	
DRAFT GEAR	
LAY GEAR	
CONE GEAR	
RACK GEAR	
TENSION GEAR	

FIG. 9

giving all the particular requisites for the work. The tag can be consulted by all interested parties at any time, and the detection of errors before the machine runs too long

are more readily possible. See Fig. 9.

"Have you ever done any plywork on your speeders. That is, any work usually done on a ply twister?" was a question John asked Dick "Yes," replied the latter, "I remove the second and third top rolls, and run the ends between the front top and bottom rolls. The work usually is of a nature that requires a more uniform twist per inch than can be obtained on a spinning or twisting machine. I contend that if you cannot get an even twist from a gear driven spindle, you surely can never get it from a band or tape driven unit."

By the way, how many roving processes are there? If formerly, a four process mill, how was the change effected to a three? What changes had to be made in the hank on the three machines and how far back of the slubber did the change extend? Are the jack frames being used for the third process? Or were they scrapped and new roving machines substituted? If the jacks, or some of them, were retained, what change was made in the flyers, if any was made? One firm the writer was associated with kept some of its jack speeders, but lengthened the flyers an inch or so.

What type of bobbins are used: plain top, beaded top, reinforced beaded top, or metal top? Plain top bobbins may give a little trouble if the traverse is too long on account of the ease with which the roving tends to slip over the nose of the bobbin. Beads and metal tips, of course, projecting slightly over the edge of the bobbins as they do, serve somewhat to check the roving unless the bobbins are actually overrun.

Metal top and bottoms are coming more and more into vogue on account of the longer life that they insure the bobbins. Another thing, the metal serves as a binder which prevents the bobbin from expanding as a cracked bobbin does that has no such fitting.

One of the most obnoxious practices in connection with speeder bobbins is that of cutting off the residue on a bobbin nearly empty—that is, after piecing in a full bobbin. Many thousands of bobbins are prematurely relegated to the boiler room, because the barrels are so badly splintered that it is really dangerous for any one to handle them; moreover, the splinters catch the roving so that it becomes almost a necessity to cut off a whole layer or so when the bobbin empties.

What is the practice in connection with examining new bobbins? Are the flyers repaired when they wear? Is there any trouble with bolsters clogging? And what is the system of cleaning and oiling them?

What is the condition of the skewers? Are the points worn, split? Is there a systematic looking over of the skewers? A periodical renewal? The writer voices a rather general feeling when he says that the blanket of silence on this subject covers a multitude of pretty sorry looking skewers. Have experiments ever been made to further reduce friction by glazing the points of the skewers? How are the skewer steps?

How do the top rolls look? As though they were receiving periodical care? Is there a system for moving the front rolls back to the next lines on weighted top rolls? Is there any sign of creasing? Is the top roll traverse working?

Who oils the spindles? Are there any shaky spindles, vibrating flyers? Are the spindles in horizontal alignment? Do the machines show signs of good care? Is there systematic overhauling of parts that wear? How often are the bottom rolls scoured? What is the cleaning system? Is this system a well laid out one, and is it compulsory for the workers to carry it out? What is the percentage of waste? Is there a system of getting bad speeder work from the spinning room and what is the procedure in taking it to the workers.

The cleaning of flyers at doffing, the quality of leather for top rolls, the weighting of top rolls, the speed of spindles, the question of whether there is a greater strain on the roving in the front row than in the back, are a few more of the many other things that are sure to come up for a talking over.

EDITOR'S NOTE—This is the fourth of a series of articles by Mr. Soniaman. The questions asked are open for discussion in our regular department entitled "How Other Men Manage." All readers are invited to participate. It is not to be expected that all will agree, but it is quite probable that each man will have his *reason why*, and that is what makes it interesting.

Modern picking machinery and its relation to better manufacturing, is discussed in an attractive booklet just issued by H. & B. American Machine Co., Pawtucket, R. I.

The following machinery is informatively described and attractively illustrated: Hopper bale opener; automatic feed regulator; condensers; conveying and distributing systems; automatic hopper feeder; new No. 3 hopper feeder; cleaning trunks; Crighton opener; exhaust opener; cage exhauster; Buckley opener; new consolidated automatic feeder, Buckley opener and breaker lapper; self-feeding opener; single beater breaker lapper with gauge box and condenser; combination self-feeding opener and single beater breaker lapper; single beater finisher lapper; and roving waste opener.

A description of the new picking equipment recently installed by this company at the Lorraine Mfg. Co., Pawtucket, R. I., is the final chapter in the book.

Extensive investigation with anti-friction shaft bearings has resulted in the design of a Timken roller shaft bearing by the Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin. This bearing is described and illustrated in Bulletin No. 4048, which is issued by this company.

The bearing is designed to withstand both radial and axial thrust and to carry large momentary overloads. In construction, two Timken tapered roller bearings are mounted on a ground steel sleeve and fitted into an accurately machined cast iron housing. The ends of the sleeve are slotted and threaded and two clamping collars which serve to hold the grease seals in place and to secure accurate adjustment of the bearings on the sleeve, are screwed on to the threaded ends.

To mount the bearing on the shaft it is simply necessary to slip it on complete and tighten the screws into the clamping rings. This tightens the sleeve on the shaft, thereby locating the shaft with reference to the bearing. It is unnecessary to adjust the bearing, as this is done at the factory.

Copies of this bulletin may be secured direct from the Milwaukee office of the company or from any of its branches.

Hippy and the Verdant Vista

BY U. DODGE.

In the early days of the cotton mill business—so early, in fact, that man was still developing his brain by the simple process of hanging by his tail so the blood could run to his head—there scampered through the forests of Europe a queer, dog-sized animal with five toes by the name of Eohippus.

Hippy didn't have any such name then, but that didn't worry him. It was not until long afterward that scientific gentlemen, who could not think in less than four syllables, bestowed it upon him as a mark of respect, for this little fleet-footed fellow, with one eye looking out for carnivorous neighbors who might gobble him down in an absent-minded and friendly way and the other eye open for good grass and underbrush, was destined to occupy a large place in the world's history, although he didn't know it then. But that didn't worry him either. He spent half his time running from his enemies and the other half running after something to satisfy an appetite made keen by the previous exercise, and would probably have been right around there yet if he had not come to the edge of the woods one day and found a good green hill covered with the best grass he had ever seen. It was the first open space he had found so far, and there was enough grass to keep him the rest of his life, so he went right into it up to the ears and ate and ate until he had to stop and blow.

Right there was where the history of the world began to change, for Hippy, knee deep in clover, looked up and saw away off another hill dancing in the pleasant afternoon heat, hazy with the mist of desire, sweet with a lush growth of green things that seemed to stretch out their arms to him and beckon him on. And Hippy went. Although he was already so full he could hardly wiggle, he deserted his good pasture, forgot it completely, and galloping down the hill, jumped the creek and raced up the other side as hard as he could go.

It was the same kind of grass exactly but it tasted better somehow, for a while anyway, so he ate a whole lot more until his eyes bulged out and his stomach dragged the ground and he had to stop and think it over. It certainly was wonderful grass right on to the top of the hill and beyond for all he knew, and it wasn't long before he felt sufficiently recovered to go and see if it really was on the other side, and as he struggled up to the top the more he thought of it the more he became convinced that if grass really grew there it must be better than what he had found. So he went and tried it, and beyond that there was another hill, and after that another and another, so that by night time poor little Hippy was not only so overeaten that he was quite sure he would never want anything more as long as he lived, but he was hopelessly lost as well, and didn't have any idea how to get back home. But that didn't worry him either. He was too full to think about it, so he crawled under a bush and went to sleep.

In the morning it was the same thing over again. There were other hills that had to be investigated and after them still others so that he ate and ran and ran and ate and kicked up his heels and nickered for joy, and the more he ran the hungrier he got, and the more he ate the better he could see the good grass over on the next hill. Sometimes he thought he would stop. There were times when he said to himself, "This is good enough for anybody. I think I had better stay here and be satisfied," but before long he would find himself looking off at another place and the farther off it was the better it looked, and in the end he always went over there and found it was the same kind of grass after all, or maybe if anything not quite as good.

So, in all of his wandering, Hippy began to form in his mind the picture of an ideal grass, a grass so long and green and luscious that there could not possibly be any better, and he excused his greedy ramblings to himself by saying that he was really looking for such a grass and that when he found it he would stop and be satisfied. And he kept running from one place to another not understanding that nothing could be quite as good as his ideal and not realizing that the restless seeking for perfection had so fastened itself upon him that he would not have been satisfied even if he had found it.

He did not realize either that he had begun to change. Not seeing any of his former playmates, he did not know that he had grown larger, stronger, quicker of brain and foot. When the hairs of his tail grew longer he only thought what a handy thing it was to swat flies with, and as four of his toes grew together to form a solid hoof, while the other toe ran up the back of his leg to get out of the way, he only thought how lucky he was to be able to kick the daylights out of his enemies. For Hippy had grown into a horse without knowing it. His mind was on the grass he was going to find some day, the day that he was going to settle down, the grass that was over on the other side of the hill—until he got there.

At last, after one long hot day when the eating had been getting poorer and poorer and Hippy was desperately hungry, he stretched his neck up as high as he could and saw the place he had been looking for so long. He was sure it was the place. Nowhere else could the trees give such a delightful shade, no other grass could look so good, and off he went. But when he got there so tired and hungry that he could hardly move, it was the very place he had started from so long ago. Hippy was back home.

Around him there gathered his former friends. They were smaller than he remembered them and looked different, somehow; and what hurt him worse than his hunger or his sore feet was that they did not seem to remember him. "Hello," he said. "Hello, boys, don't you remember me? It's little old Hippy come home." But they wouldn't speak to him. He had changed so they didn't believe him. Thought he was trying to fool them, and in their distrust they originated the first slang word that history records. "This," they exclaimed in unison, "is a horse on us," and they chased him off.

There is nothing new about this story, nothing original. It is merely an adaptation of what is probably the oldest story in the world, older than any history we know of, for this disposition to get over on the other side of the hill for a look-see is what has made history since the world began. It is a fable with two morals and a great deal of argument on both sides. It has had a thousand duplicates in the

past, will have a thousand in the future. It is the story of Cain, going into the land of Nod to begin life over again; of the Children of Israel wandering through the wilderness in search of a promised land none of them were ever to reach; of Columbus tetering across a waste of waters in a crazy cockle shell toward a new land for the discovery of which he was to endure countless hardships and thankless poverty. It is the story of all the argosies, migrations and hegiras with whose blood and sweat the progress of the world has been written. And it is the story of a great many cotton mill men today.

There are those who will say that Hippy should never have rambled off, but should have stayed home and been content. These home bodies will remind you that distance lends enchantment to a view which turns out to be a very ordinary piece of ground when you get there, and wisely state that a rolling stone gathers no moss. They will point out that Hippy went to a lot of trouble and ran a deuce of a long way to come back a ragged outcast, and suggest that if he had stayed home as a decent body should he might have been an alderman or something instead of a job for the board of health.

Others will answer that moss is not a desirable adjunct to a good live stone anyway, and that only by rolling can a polish be attained. They will also insist, and having tried it, will state with the voice of authority, that the grass very often *is* greener on the other side of the hill and worth going after. Then they will call attention to the fact that Hippy, through his adventure, grew into a horse, which, after all, is the main argument.

The little Eohippus, striking out from his fellows into unexplored territory, weak and timid and useless, grew by stress of circumstances into man's greatest helpmate. True, he came back hungry and tired and broke, which has always been the way of wanderers, but he was no longer the little doz-sized Hippy. He had grown into something much bigger and better, so much so in fact that he had never realized the change until he stood again among his old friends. So when they had chased him off and he had had time to think it over he went back and announced that he not only intended to stay there, but had decided to be the boss while he was at it and coolly kicked a few dissenters into the middle of the week following to prove his opinion.

That clinched the argument, and Hippy was the high Hee-Haw for as long as he wanted to be, but there comes the tragic part of it. He didn't last long. One day when he happened to wander off to the edge of the woods he looked out over the valley as he had done before, and away off yonder the shadows of the clouds drifted lazily over the hills and green things stretched out their branches to him and zip! Hippy was off and gone and never did come back. He had the rambling habit and couldn't quit.

So while this fable does carry two separate and neutralizing morals, which like the famous algebraic plusses create a minus on the paper and a vacuum in the head, it also carries a warning. This Hippyhorse, running and eating and fighting himself into something better bears a very strong resemblance to a great many men in the mill business who, by dint of varied experience, accumulated here and there, have broadened their outlook and capacity to fit responsible jobs, but it seems that a large percentage of them, like Hippy, get the traveling habit and can't stop. It would probably be hard to find any other industry except those which from their nature require an occasional change of location which has experienced as much moving and swapping around as this of ours. Mind you, it is not the purpose to say here that this was not and still is not a good thing within limits. The object is to call attention to the danger of forming such a habit and the consequences thereof.

With the exception of the general run of ordinary labor who, with the coming of the mills, found themselves unexpectedly released from the land which had heretofore been their sole dependence, and who trouped the length and breadth of the country in a sort of holiday spirit with no particular object in view except the exercise of their right and ability to move as often as they pleased, mill men change places from the three causes typified in the three examples mentioned above. First, like Cain, through compulsion because of past sins of omission or commission; second, as the Children of Israel in search of some ideal place where everything will be so pretty that there will be nothing to do but sit around and enjoy it; third, like Columbus, striking out for some definite purpose, with a well established end in view. Of the three, the second class is without a doubt the most frequent and the most incurable.

A man will doubtless move when he has to and there is no other alternative. Another will weigh the expense and inconvenience against a definite advantage and move when the advantage outweighs the drawbacks, and both of them will profit in the end, the one by the recollection of past mistakes, the other by the stimulus of hopes for the future; but the man who moves for the fun of it will, in the course of time, find his past experience more of a liability than an asset. He will find that having come to the place where he would like to stop he will be unable to do so, either through an ingrown inability to keep still or because of his reputation as a rambler. It has more than once transpired, when for some reason a man or two must be laid off that the management has said, "Let old man Shakefoot go. He's on the move all the time anyway and won't mind it. He'd more than likely leave before long anyway," and old man Shakefoot finds himself on the trail again for no other reason than that he has already moved too many times.

It is indeed difficult to find any man, either high or low, and who has followed the cotton mill business for any number of years, who will not confess, willingly or otherwise, that he has pretty well covered the country during that time. Formerly this was not only excusable, but there is no doubt that the condition of things during the development of the industry encouraged and required the transplanting of certain kinds of experience and ability into new territory, and if the same conditions still obtained this fable would never have been written. But those times are almost gone. While still a long way from its ultimate development, the manufacture of cotton is not, from a labor standpoint, in the fluid condition in which it was. It has crystallized to a large extent, and the invention and study of "labor turn-over" has thrown a new light on the transient worker.

Mills are increasingly reluctant to employ families who cannot give good reason for wanting to move from their former locations, and in the employment of men higher up it is often vitally important to secure those who will make a practically permanent connection. For this reason it has lately become almost impossible for an outsider to secure a good job with the larger concerns, no matter how good his record is. They do not want him because, knowing

PREVIOUS PAGES BLANK

Cotton Yarn Calculations

BY ARTHUR H. DICK.

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System of Numbering Cotton Yarns.

In the cotton trade the counts of yarn are based on a standard length of 840 yards, called a hank; a hank being the number of yards equal to the standard of any yarn, or the yards in one pound of number one yarn. From this it is seen that the standard for cotton yarn is a hank of 840 yards, weighing one pound, and it is spoken of as a number one yarn, or one count cotton.

When dealing with cotton yarns, the above standard will always be used, as well as the following weights:

7,000 grains = 16 ounces.

16 ounces = 1 pound.

Single Yarns.

It is the number of hanks, of 840 yards, in one pound of yarn that denotes the counts. That is to say, the counts increase as the yards per pound increase.

Example: What are the yards per pound in one pound of 10s cotton?

Yards per pound of—

1s cotton = 1 × 840 = 840 yards.

2s cotton = 2 × 840 = 1,680 yards.

10s cotton = 10 × 840 = 8,400 yards.

The many calculations required when dealing with cotton yarns are derived from one equation:

$$\frac{\text{length in yards}}{840 \times \text{weight in pounds} \times \text{counts}} = 1$$

Example:

$$\frac{3{,}360 \text{ yards}}{840 \times 2 \text{ pounds} \times 2\text{s}} = 1$$

For all the following calculations rules are given, which the reader should learn if he is not already familiar with them.

Finding Counts.

To find the counts when the weight in pounds and the length in yards are known, divide the length in yards by the weight in pounds times the standard.

Example: If 151,200 yards of cotton yarn weigh 6 pounds, what are the counts?

$$\frac{151{,}200}{6 \times 840} = 30\text{s}$$

To find the counts when the weight in ounces and the length in yards are known, multiply the length in yards by 16 (ounces in a pound) and divide by the weight in ounces times the standard.

Example: If 21,000 yards of cotton yarn weigh 20 ounces, what are the counts?

$$\frac{21{,}000 \times 16}{20 \times 840} = 20\text{s}$$

To find the counts when the length in inches and the weight in grains are known, multiply the length in inches by 7,000 (grains in one pound) and divide by 36 (inches in one yard) times the weight in grains times the standard.

Example: If 432 inches of cotton yarn weigh 5 grains, what are the counts?

$$\frac{432 \times 7{,}000}{36 \times 5 \times 840} = 20\text{s}$$

Finding Length in Yards.

To find the length in yards when the counts and weight in pounds are known, multiply the weight in pounds, the counts, and the standard together.

Example: What is the length in yards of 7 pounds of 30s cotton yarns?

$$7 \times 30 \times 840 = 176{,}000 \text{ yards.}$$

To find the length in yards when the weight in ounces and the counts are known, multiply the weight in ounces, the counts, and the standard together and divide by 16.

Example: What is the length in yards of 9 ounces of 20s cotton yarn?

$$\frac{9 \times 20 \times 840}{16} = 9{,}450 \text{ yards}$$

To find the length in yards when the weight in grains and the counts are known, multiply the weight in grains, the counts, and the standard together and divide by 7,000.

Example: What is the length in yards of 5 grains of 40s cotton yarn?

$$\frac{5 \times 40 \times 840}{7{,}000} = 24 \text{ yards}$$

Finding Weights.

To find the weight in pounds when the counts and length in yards are known, divide the length in yards by the counts times the standard.

Example: What is the weight in pounds of 168,000 yards of 50s cotton yarn?

$$\frac{168{,}000}{50 \times 840} = 4 \text{ pounds.}$$

To find the weight in ounces when the counts and length in yards are known, multiply the length in yards by 16 and divide by the counts times the standard.

Example: What is the weight in ounces of 80,640 yards of 32s cotton yarn?

$$\frac{80{,}640 \times 16}{32 \times 840} = 48 \text{ ounces.}$$

To find the weight in grains when the counts and length in yards are known, multiply the length in yards by 7,000 and divide by the counts times the standard.

Example: What is the weight in grains of 945 yards of 15s cotton yarn?

$$\frac{945 \times 7{,}000}{15 \times 840} = 525 \text{ grains.}$$

Equivalents.

Unfortunately the standards for yarns spun from fibers other than cotton differ. Thus, the standards are: for woolen yarn, 1,600 yards; for worsted yarn, 560 yards; and for linen yarn, 300 yards. The standard for spun silk, which is used in the manufacture of fine cotton goods, is the same as that of cotton, 840 yards.

It is sometimes necessary in cotton manufacturing to find the equivalent cotton count of a known count in another system. For this calculation the following rule is used:

Multiply the known count of yarn by its standard and divide by the standard of the desired system.

Example: What is the cotton equivalent of (a) a 21s woolen, (b) a 60s worsted, and (c) a 42s linen?

$$\text{(a)}\quad \frac{21 \times 1{,}600}{840} = 40\text{s cotton.}$$

$$\text{(b)}\quad \frac{60 \times 560}{840} = 40\text{s cotton.}$$

$$\text{(c)}\quad \frac{42 \times 300}{840} = 15\text{s cotton}$$

Ply Yarns.

Ply yarns are often used in the manufacture of cotton goods for selvages and for cords. These yarns are produced by twisting together two or more ends of yarn of equal or unequal counts. When yarns are twisted together in such a manner their weight is changed considerably, but the only change in their length is a slight amount due to contraction.

Numbering. When numbering ply yarns, the usual practice is to indicate the ply and give the counts of the single yarn. That is, if a ply yarn is composed of two ends of 28s cotton yarn it is known as "two ply twenty-eights" and it is written 2/28s. The figures 2/28s signify that two ends of 28s yarn were twisted together and that the ply yarn is equal in weight to a single end of 14s—with a slight exception. During the process of twisting, the ends contract slightly; making the ply yarn a little shorter than the single ends of which the ply yarn is composed. No hard and fast rule can be given here for determining the amount of contraction that takes place during twisting, and as it is so very slight it will not be considered in any of the following calculations.

Ply Yarns Composed of Equal Counts.

In the case of ply yarns composed of equal counts, the ply or twist count is equal to the single counts divided by the ply.

Example: What are the counts of a ply yarn composed of two ends of 30s cotton yarn?

$$30 \div 2 = 15\text{s}$$

Proof:

1 lb. of 30s cotton yarn $= 30 \times 840 = 25{,}200$ yards
1 lb. of 30s cotton yarn $= 30 \times 840 = 25{,}200$ yards

2 pounds = ...25,200 yards

Then, using the rule for finding the counts:

$$\frac{25{,}200}{840 \times 2} = 15\text{s}$$

Example: What are the counts of a ply yarn composed of three ends of 60s cotton yarn?

$$60 \div 3 = 20\text{s}$$

Ply Yarns Composed of Unequal Counts.

It is not often that it is necessary to twist together yarns of different counts to form a ply yarn. It is sometimes necessary though when a fancy yarn or twist is desired.

To find the counts of a ply yarn composed of two ends of different counts, multiply the two counts together and divide by their sum.

Example: What are the counts of a ply yarn composed of a 30s and a 20s cotton yarn?

$$\frac{30 \times 20}{30 + 20} = 12\text{s}$$

To find the counts of a ply yarn composed of more than two ends of different counts, divide the highest counts by itself and by each of the other counts, then divide the highest counts by the sum of these results.

Example: What are the counts of a ply yarn composed of one end each of a 20s, a 30s, and a 60s cotton yarn?

$$60 \div 60 = 1$$
$$60 \div 30 = 2$$
$$60 \div 20 = 3$$
$$6$$
$$60 \div 6 = 10\text{s}$$

To find the counts of a ply yarn composed of more than one end of the different counts, divide the highest counts by itself and by each of the other counts, multiply each result by the number of ends of that count, and divide the highest counts by the sum of the last results.

Example: What are the counts of a ply yarn composed of 3 ends of 60s, 3 ends of 30s, and 2 ends of 20s cotton yarn?

$$60 \div 60 = 1 \times 3 = 3$$
$$60 \div 30 = 2 \times 3 = 6$$
$$60 \div 20 = 3 \times 2 = 6$$
$$15$$
$$60 \div 15 = 4\text{s}$$

Sometimes a ply yarn of a certain counts is desired and it is necessary to find the counts of a yarn that twisted with a known counts will produce the desired counts.

To find the counts to be twisted with another counts to produce a desired counts, multiply the known counts by the desired counts and divide by their difference.

Example: What counts of yarn must be twisted with a 60s cotton yarn to produce a 40s cotton yarn?

$$\frac{60 \times 40}{60 - 40} = 120\text{s}$$

Example: What counts of yarn must be twisted with a 20s and a 30s cotton yarn to produce a 10s cotton yarn? First, find the counts resulting from twisting a 20s and a 30s cotton yarn together:

$$\frac{20 \times 30}{20 + 30} = 12\text{s}$$

Then, find the unknown counts:

$$\frac{12 \times 10}{12 - 10} = 60\text{s}$$

When a certain weight of ply yarn is desired it is necessary to find the weight of each single yarn of the different counts that are to be used to produce the required weight of ply yarn. The following rule is applicable to all calculations of this character:

Divide the highest counts by itself and by each of the

(*Continued on page* 80.)

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND.

The examples described in the preceding installment of ordinary and medical hucks are typical of the great bulk of this class of fabric. Nevertheless, the huckaback motif is very adaptable, and is found in twill and diamond forms on comparatively large numbers of threads and picks, as well as in smaller variations.

One of this last-mentioned class is exemplified by the

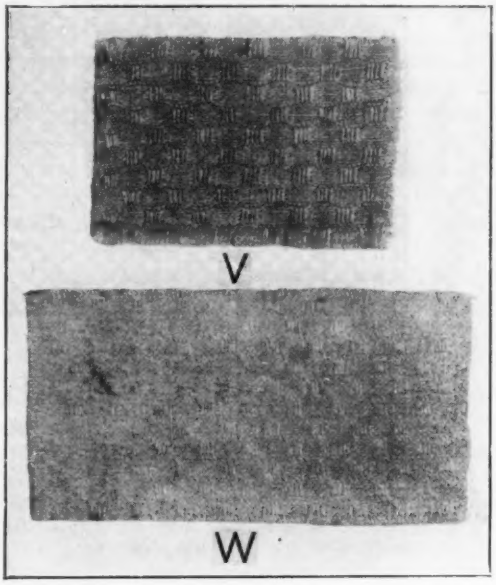

FIG. 69.

two fabrics V and W reproduced in Fig. 69. Both have exactly the same weave, viz., that known as the "basket huck" or "honey-comb huck"; the two cloths, however, are in different qualities. The upper fabric V is of unbleached but boiled flax tow-warp and filling, while the lower sample W is of bleached yarns of the same kind. The up-

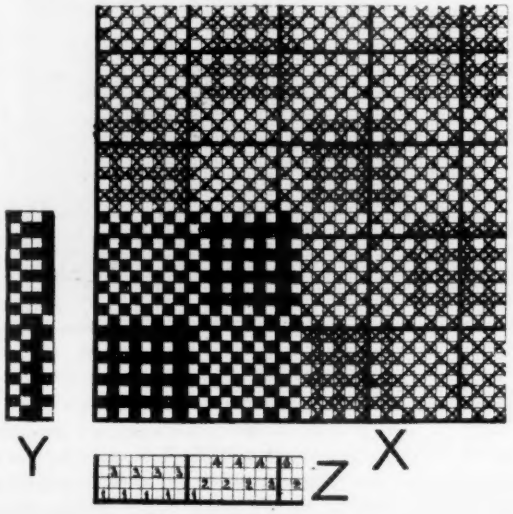

FIG. 70.

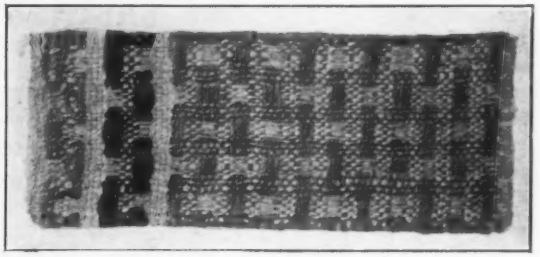

FIG. 71.

per fabric V has 53 threads and 56 picks per inch, while the lower cloth W has 45 threads and 50 picks per inch.

The fabric W, Fig. 69, has evidently been subjected to heavier pressure in finishing than fabric V; it is not the best practice to give these fabrics too heavy a pressure in the finishing process, as great pressure obviously flattens the cloth and tends to obscure the characteristic surface features of the structure. A light beetling is usually sufficient.

The point-paper plan for both weaves V and W, Fig. 69, is given at X, Fig. 70. It is complete on 18 threads and 18 picks, and four units or repeats are shown. It may be woven on 4 harnesses, with any suitable draft and weaving plan. Weaving plan Y, Fig. 70, has the advantage of having the plain interweaving threads on the front two

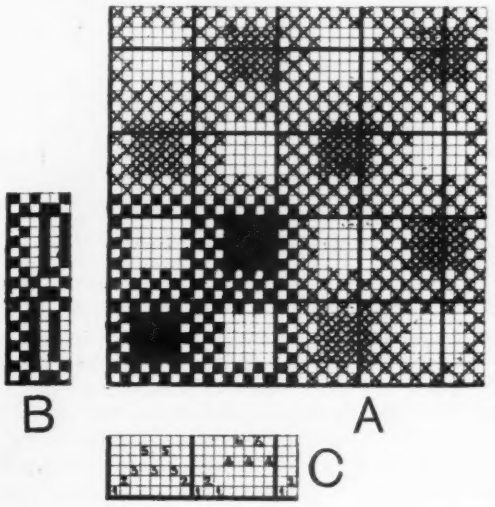

FIG. 72.

harnesses; it would be used along with the draft Z in the same figure. But it is more usual to employ the proper variant of the so-called huckaback draft—one example of which is shown at V, Fig. 68—and its appropriate weaving plan, because of the facility given to changing over to plain weave.

The weave X, Fig. 70, is known, as already stated, as the basket or honeycomb huck, and the warp threads for such cloths are generally reeded two threads per split. The ordinary 10 by 10 huck, as well as the 10 by 6 Devon or

medical hack, is also reeded in two, but, on the other hand, they are occasionally reeded in twos and threes alternately. In the latter case, the two floating threads with a plain weave thread between form the group of three, while the remaining interlacing plain threads form the group of two.

Figure 71 is reproduced from a small sample of bordered huckaback of a special kind and which contains 44 threads per inch of unbleached but boiled flax line, and 36 picks per inch of bleached flax tow filling. The threads forming the stripe proper are 2-fold red and 2-fold white cotton yarns, worked double warp, i.e., two threads in each mail of the harness.

The order of the warp is indicated below:

2-fold white cotton	6	$4 \times 2 = 8$	$4 \times 2 = 8$	Reverse and Repeat.
Unbleached flax line	18			$\times$
2-fold Turkey-red cotton		$8 \times 2 = 16$		

The bracket and vertical line represent the middle of the fabric, and x is half the number of threads forming the body of the cloth.

The design for the fabric in Fig. 71 is shown at A in Fig. 72, and indicates that the unit weave is complete on 18 threads and 18 picks, while the weaving plan B shows that 6 harnesses are necessary. The draft corresponding to

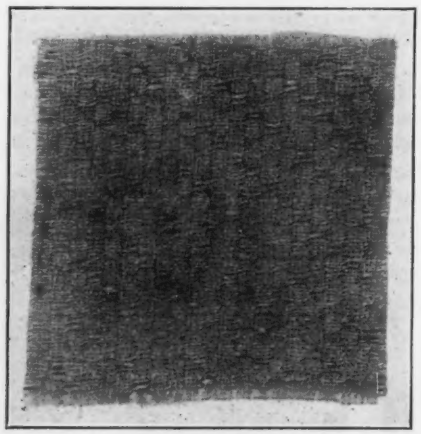

FIG. 73.

this weaving plan appears at C in the same figure. This draft keeps the plain threads on the two front harnesses; as these threads have the maximum amount of interlacing, they have the minimum chance of breakage, and are in the most convenient position for easy repair.

Figure 73 shows a fabric woven in twilled huckaback with 40 threads per inch of 2-fold cotton warp and 48 picks per inch of flax tow filling. The corresponding point-paper design appears at D in Fig. 74, along with one weaving plan F, and the corresponding draft E. The weave is complete on 20 threads and 20 picks, and capable of being drafted on 6 harnesses. The construction may be readily followed by comparison with weave M in Fig. 66, and by noting how the design is built up in blocks of 5 threads and 5 picks.

A union fabric, woven with 50 threads per inch of 2-fold cotton warp and 45 picks per inch of linen filling, is reproduced in Fig. 75. It is a typical example of a diamond huckaback. Four repeats of the unit weave are shown at G in Fig. 76, where it will be noticed that although the unit weave is complete on 40 threads and 40 picks and a comparatively elaborate effect is produced, yet only 6 harnesses are necessary for its reproduction; see weaving plan H and the corresponding draft J in the same figure—this draft carries the plain threads on the front two harnesses.

The construction of the complete design may be readily

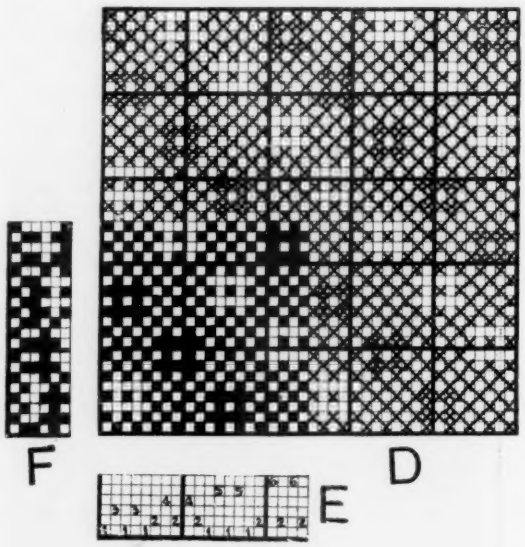

FIG. 74.

understood after reference to the key plan N and to the three different 5 by 5 blocks K, L and M in Fig. 76. The key-plan N contains 8 by 8 = 64 small squares. Some of these squares are filled in solid block, others are left blank, while the remainder are marked in crosses. The complete key-plan N obviously represents a small diamond design.

In the development of the complete weave G in Fig. 76,

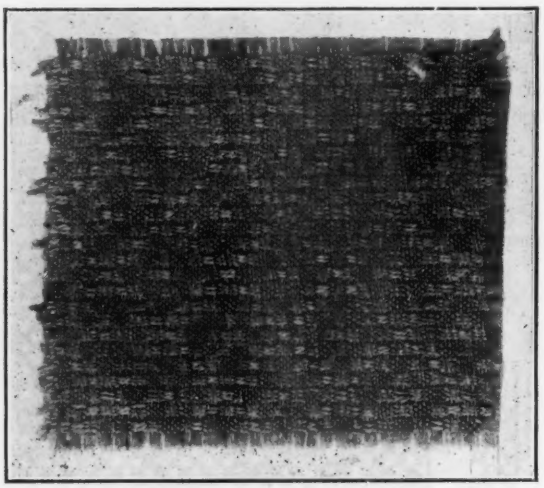

FIG. 75.

each little square of the key-plan represents a block of 5 threads and 5 picks. Those squares which are solid black in the key-plan N, are marked similarly to K, the warp float effect, while those squares marked with crosses are marked similarly to M, the plain weave effect. Lastly,

(*Continued on page 75.*)

Human Relationships in Industry

BY W. M. McLAURINE.

Orders.

One of the duties of any executive, either major or minor, is to give orders, directions or suggestions. This is a perfectly natural deduction. He must have sub-executives or operatives, who work in his department. In order for work to proceed efficiently, he must direct it, using the three means indicated in the first sentence. There are times when each one of these means should be used. Orders, directions, suggestions indicate degrees of mental states, and methods of securing action.

Orders and the way they are delivered indicate the type of executive the group have as their overseer or foreman. They also indicate the type of man the executive is. All people, rich or poor, great or small, desire authority. They like to boss. They like to control. They like to walk around and have things done. Many people who crave this ability are unfit to have it. It is a very great responsibility to have authority to control the human factor in industry, or to direct and route production or operations. Many people in the possession of authority think they must always be giving evidence of their possession. They think they must demonstrate to those under them how powerful they are, and to those above them how well they use the responsibility that has been entrusted to them. Hence, they go here and there, ordering this and that, parading like a peacock strutting with his tail spread in a kaleidoscope of colors, good to look at, but not meaning much. They think in a large measure of their own pomposity, dignity, and with what awe and reverence the operatives regard them, when it is often the case that just the reverse is true.

I have noticed that the greatest executives seemingly use their authority least. A Ford car puffs and vibrates rapidly under a load, but a Packard or Rolls-Royce quietly rolls off and noiselessly takes the grade. In other words, the man who is continually giving orders and countermanding orders, and flits and frets about his work, appeals to me as a man of small calibre.

Routine work, well planned, needs but very little authoritative manifestation in its execution.

The fact that an operating executive is compelled to issue so many orders and directions is not due to the operatives only indirectly. Directly, it is due to the executive. It is his problem to examine himself to find out why such is the case.

Besides the technical characteristics of the order there are certain facts which the executive should take into consideration.

The tone of his voice has a great deal to do with its comprehension and happy execution. The facial expression accompanying the order is a factor in its effectiveness. In short, the general manner of giving orders is a great factor in the influence, execution, and reaction desired. An executive generally grows in favor or disfavor with his group according to the methods he uses in giving orders. There are some executives whose slightest wish is hastily and happily executed. There are others whose orders are executed only because of pure necessity and then only so far as possible to prevent trouble. An old adage, "Not what you say, but what you are," is a great factor in this supreme responsibility of the overseer.

There are five objectives to be attained in this conference:

1. To discover the component parts of an order.
2. To analyze the causes for defects or misinterpretations of orders.
3. To discuss the costs of the defects or misinterpretations of orders.
4. To discuss the means of overcoming the misinterpretations of orders.
5. To discuss the manner of giving orders.

Below are nine cases which the conference leader may use with the group in trying to determine these five objectives. It is also suggested that the various members of the group shall project actual cases, occurring in their experience, stating the conditions necessitating the orders, the form and method of giving the order, and the results obtained. Names and personalities should be excluded and the discussion should be conducted without bias or prejudice. The five objectives indicated should be used as headings for results of the discussion of cases.

1. A foreman from another part of the country erecting machinery in a southern mill told a local man to get him some roving skewers. The man stated that they did not have any. The local term was roving stick. What was the matter with this order?

2. A new overseer in taking charge of a room hired several new hands. A few days later it was reported that a great deal of theft was evident. The overseer ordered the doors locked and everyone searched. What was the matter with this order?

3. A foreman in a machine shop asked one of his help to get him a journal. The fellow proceeded up town and purchased the daily journal which he handed to the foreman upon his return. What was the matter with this order?

4. A fire in a spinning room necessitated the use of outside water pressure. The master mechanic was ordered to turn on the water. The mechanic he sent turned on every hydrant but the right one. What caused this faulty carrying out of orders?

5. An overseer instructed one of his new help to go to the master mechanic and secure ten feet of single ply 2-inch leather belt beveled on each end, a can of cement and two clamps and to hurry up and not fail to return with everything. Is there anything the matter with this order?

6. A weaving overseer ordered a second hand to change the warp on style No. 452 from 39s to 40s. The overseer a few minutes later caught the second hand changing every loom in the section. What caused this faulty carrying out of orders?

7. A carding overseer ordered his second hand to have a certain change made on a slubber. The overseer noticed a few minutes later that the roving was running light. What caused this error?

8. A barge of lumber had torn loose from its mooring and was rapidly moving down stream toward another barge anchored several yards away. The foreman on

shore shouted, "Throw out your anchor." The man on the boat shouted, "It hasn't any rope attached." The foreman shouted, "Throw it out anyway." What was the trouble here?

9. A man in charge of group workmen, whenever there is a disagreeable job to do will ask a man if he doesn't want to do it. The man does it grudgingly. Is this a good way to give an order?

The following outlines and explanations are the result of a discussion of the above and other cases with a group of operative executives:

I. Component parts of an order: 1. Who? 2. What? 3. Where? 4. When? 5. Why? 6. How?

The first four of these components are always present when an order is properly given. The fifth may be termed an explanatory characteristic and is often necessary. The sixth should be a component under certain conditions.

An order must be given to some one, to do something, at some time, and at or in some place. You may not agree with this statement. These four are always present, either expressed or implied. The absence of any one of these factors renders an order incomplete.

An overseer in passing through his department sees a man striving to lift some heavy object. He remarks, "John, get some one to help you lift that," then he passes on.

It happens that there is not a very cooperative spirit in the organization and particularly toward John. John turns to a fellow worker and asks him to help him. The worker says, "Did the overseer say for me to help you?"

John replies, "He said for me to get somebody."

So the fellow worker turns to his own task with the reply, "Well, get somebody then."

By and by the overseer comes back and John is still working alone and the heavy object has not been moved. Who is to blame?

We have all heard of the sergeant who got permission from his commanding officer to go to the post office. His C.O. asked him to see if there was any mail for him. The sergeant returned and informed the C. O. that there was mail for him. The C. O. asked him for it, but the sergeant replied, "Sir, you only ordered me to see if you had mail." What was the trouble here?

In giving an order, the sixth component is not necessary unless the executor of the order does not understand how to execute it, or unless the giver of the order desires it executed in a special or particular way. The overseer must be sure that the receiver of the order must understand the way he desires it executed, or he has no right to censure the executor unless the executor of the order premeditatedly and wilfully failed in carrying it out. There may be other conditions and doubtless are, in which the sixth component should be a factor of an order. There are certain responsibilities that rest upon the receiver of the order, when he knows he does not understand or fully understand how to execute it, and does not let this fact be known.

The fifth component or "Why?" may seem to many as entirely superfluous and unnecessary. The old maxim of the Army, "A soft head and a hard backbone make a good soldier," is sometimes a slogan of an overseer. It is not necessary for the operative to know why? All he needs is to do the job. Why he does it, or why it is done, is none of his business.

I recall discussing this component of an order with a group of foremen in a railroad shop. This case was brought forward with many others, showing that under certain conditions it was necessary for the operative to know why.

There is a standard way to put the flanges on the drive wheels of a locomotive. There was, in this shop, a job of putting the flanges on the drive wheels of a certain locomotive. These wheels, because of some peculiarity due to use or some other cause, would not function right with the flanges put on the standard way. The foreman, in giving the order for this work said he felt that it was necessary for the workman to know why for two reasons. One reason was, to impress upon him the peculiarity of these wheels, and second, that the workman might use his skill in overcoming the previous defects.

The mind of man is a wonderful thing in its ramblings and conclusions. An intelligent workman is a more efficient man than the one who works blindly, doing things when he does not understand for what reason they are done. The mind, working in conjunction with the hand, or the machine, is a wonderful assistant to happiness and contentment. It will be well for the group to pause here and project certain orders that have been given in which the fifth and sixth components should be parts.

It is possible for an order to be given, and then certain defects or misinterpretations to arise. This brings us to the analysis of the second objective.

II. Causes for defects or misinterpretation of orders:

1. Haste. (a) On part of one giving order. (b) On part of one receiving order.
2. Inattention.
3. Lack of conciseness.
4. Lack of completeness.
5. Vagueness.
6. Lack of understanding on part of man receiving order.
7. Indirect orders.
8. Too much to remember.
9. Delivery at wrong time.
10. Multiplicity of orders.
11. Lack of proper sequence.
12. Excitement.
13. Lack of knowledge of conditions.
14. Forgetting to give orders.
15. Forgetting to follow orders.

These are some of the reasons brought out. There are many others, and they can be added to these as the group suggests them. A caution that should be contained in all of these chapters, and I have tried to put it in, is that the conference leader should not copy these outlines or suggestions on the board, but should develop them in the group.

Again, the order in which they come is of little importance in their development. If the leader desires to regroup them under certain heads after they are developed, he may use his judgment, but the main objective, is to get the members of the group to realize that there are causes, and then find them.

Errors and omissions are costly. Defects and misinterpretations of orders are costly. Some of them can be computed in dollars and cents. Others can be indicated, and their value can not be thus measured, but the cost factor is often greater than the pure financial one. The third

(*Continued on page* 70.)

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What the Southern Mills are Doing

It is understood that the Dwight Manufacturing Company plant at Alabama City, Alabama, will be electrified. The mill now operates from steam power with mechanical drive, and it is reported that electric motors will be installed, and power procured from the lines of the Alabama Power Company.

The Profile Cotton Mills, at Jacksonville, Alabama, have placed a contract for the installation of a High Duty air-conditioning system with automatic regulation. The equipment will be furnished by the Charlotte, N. C., office of the Parks-Cramer Company.

Newnan Cotton Mills, at Newnan, Georgia, have filed plans for the erection of a two-story brick and concrete addition, to be 150x85 feet. The addition will be adjacent to the present cotton warehouses, and when completed will be equipped as an opener department.

The McLin Textile Mills, at Rome, Georgia, which have purchased yarn for weaving into specialty products, are understood to be planning the installation of spinning equipment to produce the yarns for their use.

The Larnell Cotton Mills, Whitehall, Georgia, have been incorporated with a capital stock of $50,000. H. M. White, W. W. Crews, and O. W. Bowen are among the incorporators.

An addition to the Augusta Factory, Augusta, Georgia, is planned, it is rumored, upon announcement of an increase in the preferred stock of the company.

Novelty shirtings are being produced at the plant of the Bremen Looms, Inc., at Bremen, Georgia, which recently started operation. J. A. Mandeville, of Carrollton, is president, and R. A. Whatley is superintendent in charge of the plant. J. E. Sirrine & Company were the engineers who remodeled and directed the equipment of the plant.

American Utilization Company, Bessemer City, North Carolina, has been granted a charter, for the purpose of manufacturing yarn, cloths, etc., from cotton. The capital stock is $100,000, and the incorporators include R. G. Cherry and Frank and Sadie Goldberg, all of Gastonia.

The new plant of the Burlington Cotton Mills, at Burlington, North Carolina, recently completed, has been placed in operation, producing scrims and dobby fancies. The equipment consists of 10,080 spindles and 235 looms.

An addition of 24 new cards and one breaker lapper has been made to the equipment of the Norwood Manufacturing Company, at Norwood, North Carolina.

The Charlotte plant of the Barber Manufacturing Company has been placed in operation, it is stated. Motor drive is used in the plant, and Crompton & Knowles looms are included in the equipment. The directors of the company are Thomas Burke, Frank Burke, and W. Wallace Cunningham.

A bleachery for Stoneville, North Carolina, is planned by northern interests, according to a rumor based on option being taken on several possible sites.

The new weave shed of the Minneola Manufacturing Company, at Gibsonville, North Carolina, is now being constructed. When it is completed, looms from the present mill as well as 278 new looms, will be installed. It is anticipated that additional preparatory machinery to equal the added weaving capacity will also be installed in the space made vacant by the removal of the looms from the present mill.

The charter of the Mansfield Mills, Inc., East Lumberton, North Carolina, has been amended to increase the capital stock from $1,000,000 to $1,200,000.

The Alexander Mfg. Company, at Forest City, North Carolina, it is reported, will add a number of looms for weaving sheetings and pillow casing.

Cannon Mfg. Company, Concord, North Carolina, has recently had additional opening machinery installed at its plant.

Shelby Cotton Mills, at Shelby, North Carolina, is to erect an extensive addition. The structure will be three stories high, 162x75 feet. Additional manufacturing machinery, it is understood, will be installed at the completion of the construction work.

Vardry Mills, Greenville, South Carolina, of which Clifton Corley is president, have increased their capital stock to $275,000.

Contract for the new weave shed of the Excelsior Mills, Union, South Carolina, has been let to H. J. Howitz, Greenville. The addition to the plant will cost approximately $75,000 it is stated.

The plant of the Clinton Cotton Mills, Clinton, South Carolina, will be electrified, it is announced, at an estimated cost of $150,000. W. J. Bailey is treasurer.

The Victor-Monaghan Mills have purchased four additional Murray cotton cleaning and aerating machines for their opening department.

The new school building of the Union-Buffalo Mills Co., at Buffalo, South Carolina, will be completed by January, 1925, it is expected. This structure is to replace the one destroyed by fire last year, and will accommodate 500 pupils, it is stated.

Contract for the installation of yarn-conditioning equipment has been placed with the Parks-Cramer Company, of Charlotte, North Carolina, by the Blacksburg Spinning Mills, Blacksburg, South Carolina.

Alice Manufacturing Company, Easley, South Carolina, has placed contract with Parks-Cramer Company, of Charlotte, North Carolina, for the installation of High-Duty air-conditioning equipment in their new addition.

Pioneer Cotton Mills, Guthrie, Oklahoma, will improve and extend their plant at an approximate cost of $200,000, through the installation of additional machinery, etc.

It is reported that the Miller Cotton Mills, of Waco, Texas, are considering the erection of an additional mill and bleachery.

New machinery is being installed to replace existing equipment at the No. 1 Mill of the Cotton Mill Products Co., at Natchez, Mississippi.

The Unity Investment Company, Griffin, Georgia, has been organized with a capital of $650,000 for the establishment of a mill to manufacture sateens. A 400-loom plant is proposed. W. F. Ingram is president of the company. J. E. Sirrine & Company, Greenville, S. C., are preparing the plans, it is understood.

Linn Mills Company, Landis, North Carolina, have closed contract with Parks-Cramer Company, of Charlotte, North Carolina, for the installation of High Duty air-conditioning equipment in their new extension.

Will this partition be an "orphan"?

Real dollars are being invested but the books probably will never show them

This partition when erected may represent an investment of $500, which will never appear on the books of account. Materials are drawn from supplies; erection is done by regularly employed plant labor. Both are charged to expense.

Not an important item in itself, but these changes and improvements are going on every day. In a certain large concern, an analysis of their properties revealed a total of over a million dollars worth of property for which there was no record.

The most expeditious and efficient means of assuring the inclusion of all legitimate expenditures in capital, of differentiating between capital and expense charges, of assuring a proper basis for depreciation, and of maintaining adequate record and efficient control over physical properties is by means of continuous American Appraisal Service.

It assures accuracy, disinterestedness and provability in property analysis and valuation.

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INVESTIGATIONS, VALUATIONS, REPORTS — INDUSTRIALS, PUBLIC UTILITIES, NATURAL RESOURCES

An American Appraisal

THE AUTHORITY

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The New England Mill Situation.

The losses that have been suffered in cotton manufacturing during the past year are now beginning to be made known to mill stockholders at annual meetings. The Amoskeag Manufacturing Company, the largest producer of dress ginghams in the world, showed an operating loss of nearly $3,000,000 for the year ending on June 30. The Pepperel Mfg. Company showed an operating loss of nearly a million dollars compared with the preceding year. The losses sustained by the Pacific Company for the first half of the year were in excess of $1,000,000, as already published, and these are only a few. The fact that mills go on paying dividends illustrates the conservatism of other years and the existence of reserves that are now being drawn on severely.

The easy going attitude of the New England public toward these showings is a most exasperating thing to mill managers who continue to protest against the heavy taxation and the legislative restrictions imposed on industry here compared with conditions elsewhere. Nothing seems to stir people up to an extent where they realize that the handicaps of short hours cannot be overcome as they were in previous years of what is looked upon as advanced social reform.

In the early part of this month the owners of the American Printing Company at Fall River went to Kingsport, Tenn., to attend the laying of a corner stone of a new plant being established there to accommodate cotton mill equipment to the extent of 100,000 spindles, that is to be removed from Fall River, to the southern center. The incident means a loss of industrial power for the residents of Fall River, yet the lesson was passed over as of no more consequence than if it had not been told. The removal of such a substantial part of this great plant actually caused less stir than if a new type of automobile was to be shown in a local garage.

There has been a very considerable gain in production in the mills in the past month but it is estimated that 4,000,000 spindles are still inactive or operating on short time. At last accounts less than a third of the cotton machinery of the Amoskeag Company was in motion. The Consolidated Textile plants in Rhode Island are still not running except in the case of bleacheries. Barely one-half the Fall River mills are running to capacity. New Bedford mills are employed to the extent of about 85 per cent. The progress toward capacity output has been nothing near so rapid as that noted in southern mills, and this fact has impressed manufacturers greatly.

Quite as much as the existence of lower costs in the South, the recuperation there calls attention to the extent to which the heavy goods manufacturing has left New England. The trade recovery has been in the heavy goods end more largely than in the lighter goods end or the dress materials. And southern mills now produce a very substantial part of the tire fabrics, cotton ducks, wide cloths for enameling and rubberizing, and a host of heavy specialties in drills and working suit goods that were formerly made in a large way in this section.

It will be three or four months before many people in the cotton goods business begin to grasp fully just what has happened following sustained high cotton. Financial returns in stockholder's meetings tell a part of the story. But there have been many losses of trade connections that will not be fully appreciated until competition forces a study of what must be done to get old trade back. This applies to business in odd print cloth yarn goods made at Fall River, many lines of closely woven specialties formerly made in Rhode Island mills, many of the ginghams formerly procured largely from New England plants, and a host of miscellaneous small lot specialties that will be made South in future years because customers have learned from experience that goods bought there this year have proved satisfactory.

High cotton forced the New England specialty mills to shut down and in a great many instances, rather than start up on small orders, users of goods were forced to get them where they could. Southern mills are now represented so much better in the markets than they were twenty years ago that orders were picked up and taken care of South before it was fully realized to what an extent substitution of makers had gone. At present costs are so much in favor of southern mills that it may well be that some of these losses will become permanent. This will be found in the restrospect to be the real cause for so much agitation in New England favoring a diversified production in fancy weaves to get away from southern competition.

The foregoing paragraphs may mislead an uninformed reader into thinking that this year has marked the beginning of the end of the cotton manufacturing business in New England. The facts rather imply otherwise. Unrest against present methods of mill management in New England continues to spread.

In an address delivered before the Lions' Club in Fall River, Chairman Joseph A. Parks, of The Industrial Accident Board of the State of Massachusetts, declared that "family tradition, family pride, and family desire to continue at the head of each small corporation a member of the family" was preventing mills from consolidating, something that might be of benefit to the workers and stockholders. The speaker in this instance happens to be a state official who was formerly a member of a weaver's union in Fall River. But in the same city, one of the war enriched stockholders who has bought into some plants, is engaged in writing to other stockholders in corporations where his new interests lie, urging them to take action to either consolidate the management or to vote for a change of present managers. In still another case, it has developed that an offer has been made of $40 a share for the Arkwright mills in that city, by persons who intend to consolidate managements if they secure control.

These things are illustrative only of the temper of varying sections of people who have become impressed with the need for doing something to improve the status of New England manufacturing. So long as the agitation lasts, even if it seems to come from impertinent sources, it will be prima facie evidence that the old New England spirit has not succumbed to a series of troubles unknown in its greatest industry in other years.

It is worthy of mention, perhaps, that after all, the owners of a mill in this American country ought to be allowed to do as they please with it, and be free from comments such as those made by this state official. The stockholders own the mills and if they prefer to have them managed for reasons of "family pride" or other reasons, it is pretty far fetched to permit them to be castigated by a former employee whose salary is being drawn from public sources. Naturally, the talk is not palatable. It is par-

H & B AMERICAN MACHINE COMPANY

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—BUILDERS OF—

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BREAKER
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and FINISHER
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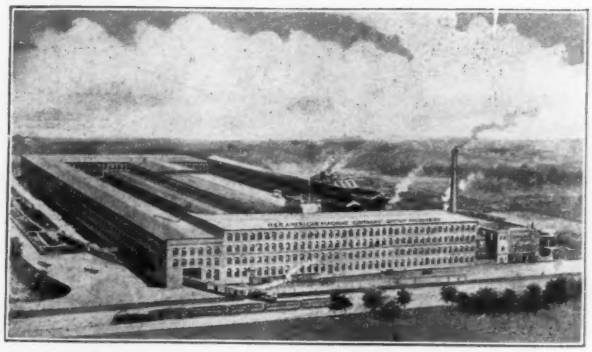

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CARDS
DRAWING FRAMES
SLUBBING
INTERMEDIATE
ROVING FRAMES

SPINNING FRAMES and TWISTERS
(Band or Tape Driven)

RINGS—FLUTED ROLLS SPINDLES—FLYERS

Southern Offices: 814-816 Atlanta Trust Co. Bldg., Atlanta, Ga.

ticularly aggravating because the Accident Board and many other boards that interfere on the score of "public welfare" to impose higher taxation and other costs upon production are typical of some other things that are going on in the nation to hurt the cotton industry in particular.

Several reports have been published in southern papers to the effect that New England cotton manufacturers are engaged in pushing national legislation on child welfare with the hidden intention of hobbling southern competition. Nothing can be further from the truth as many southern manufacturers well know. There are people who own stock in mills in New England, who are engaged on the mistaken score of philanthropy, in backing this national legislation scheme. But they are not acting for mills or for manufacturers. They are acting on their own initiative, and they are the same people who have done a large share of the work that has crippled New England manufacturing through unequal and unfair restrictive legislation.

A number of important manufacturers in this section do not expect that the cotton goods business is going to be spectacularly prosperous after the national election. Naturally, as high protectionists, they hope for a Republican victory and they feel that business will be better.

One of them pointed out only a few days ago that textile competition from Europe is going to be a very severe matter in the next few years. The normal result of loaning Europe money for the purchase of raw materials here will be to reinstate production in the textile mills of Europe. As those mills work on a much lower wage and production scale than mills in New England or the South in this country, it follows that they will be able to send goods here for sale under prices ruling in this country, or failing to get in here, they will swarm in foreign markets and thus exclude the possibility of American mills doing a large textile business abroad.

Business in the textile machine shops of New England is recovering much more slowly than business in the mills. Some of the large machine shops are running half time with half a normal working force. It is currently reported that many of the shops are experimenting a great deal with new machinery and some of them are doing more research work than has ever been attempted in other periods of trade depression. Thus far few notable new machines have come to public attention.

Finishing plants throughout this section are averaging less than 50 per cent capacity operations. The job printers are not getting their usual volume of trade as business on convertibles is unsatisfactory. They are doing much more work on artificial silk products than ever before. Silk and cotton products as a whole are relatively more active in New England than any other single textile.

Adapting light to a purpose is a subject that interests all men alike. Upon this premise, the Cooper-Hewitt Electric Company, 95 River Street, Hoboken, N. J., has prepared for distribution to manufacturing executives and others interested an attractive and informative booklet on the subject of light. The advantages of the proper kind of light for manufacturing purposes is especially dealt with, and illustrations are shown of cotton mills and other concerns illuminated with the Cooper-Hewitt "Work-Light," which the booklet describes. The installation, maintenance and other points of this equipment are completely treated.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, October 11th, 1924.

The movement of the market during the past month was to a higher level, having advanced nearly five cents from the previous low price, until checked by the recent government crop forecast, which resulted in a decline of about two cents.

Returns to the government, as of October 1st, averaged the condition of the crop at 53.5, indicating a yield of 12,499,000 bales vs. 10,140,000 last year. Linters not included.

Another depressing influence was the Census Bureau report showing ginnings to October 1st to have been 4,525,520 bales compared with 3,231,555 to September 25th last year.

Private advices from the interior are to the effect that the cropis being ginned faster than to even date last year when 31.8 per cent of the crop was ginned to September 25th, but the trade looked upon the heavy ginnings to 1st inst. as tending to confirm the government's crop forecast.

Compared with last season, the indicated crop, by states, is as follows: Virginia, 35,000 vs. 51,000; North Carolina, 723,000 vs. 1,020,000; South Carolina, 671,000 vs. 770,000; Georgia, 1,118,000 vs. 588,000; Florida, 32,000 vs. 12,000; Alabama, 959,000 vs. 587,000; Mississippi, 1,113,000 vs. 604,000; Louisiana, 423,000 vs. 368,000; Texas, 4,255,000 vs. 4,342,000; Arkansas, 1,068,000 vs. 628,000; Tennessee, 402,000 vs. 228,000; Missouri, 201,000 vs. 121,000; Oklahoma, 1,272,000 vs. 656,000; California, 60,000 vs. 54,000; Arizona, 95,000 vs. 78,000; New Mexico, 55,000 vs. 34,000; all others, 17,000; United States, 12,499,000 vs. 10,140,000.

(NOTE—Returns for New Mexico last year included all others.)

Ginnings by states, October 1st this year vs. September 25th last year: Alabama, 399,799 vs. 161,252; Arizona, 22,531 vs. 7,621; Arkansas, 227,010 vs. 48,738; California, 11,933 vs. 4,338; Florida, 10,958 vs. 4,624; Georgia, 393,786 vs. 186,051; Louisiana, 263,069 vs. 108,388; Mississippi, 464,626 vs. 109,753; Missouri, 3,300 vs. 724; North Carolina, 36,478 vs. 156,459; Oklahoma, 241,702 vs. 64,140; South Carolina, 158,103 vs. 192,172; Tennessee, 15,888 vs. 3,407; Texas, 2,273,544 vs. 2,181,962; Virginia, none vs. 894; all other states 2,793 vs. 1,032; United States, 4,525,520 vs. 3,231,555.

The indicated crop is not as large as it was earlier in the season, as noted by the following government forecast:

August 23rd	12,956,000 bales
September 8th	12,787,000 bales
September 23rd	12,596,000 bales
October 8th	12,499,000 bales

As a result of the downward revision in official crop estimates, Europe continues to buy freely of the American product, as trade is expected to improve abroad in consequence of the Dawes plan probably becoming operative when the German loan, which is expected to be subscribed next week, becomes a reality.

American spinners, however, have been slow to act, and continue to buy from hand to mouth only, owing to the uncertainty attending the presidential election and because of the assurance of a larger crop this year.

Following the lowering of the grade in the Southwest by the September rains, especially in Texas, there occurred considerable damage to the grade of open cotton in the South Atlantic states by the recent excessive rains in that section.

While it is possible for the market to work somewhat lower, prices are again getting low enough to justify trade buying on the part of domestic mills. Some people are of the opinion that the low prices of the season were witnessed last month when values were about two cents lower. After the election, better markets and more demand is anticipated.

STATISTICS.

	Bales This Season	Bales Last Season
Marketed since August 1st	3,019,000	2,842,000
Exports from the U. S. since Aug. 1,	1,154,000	1,044,000
Spinners takings since Aug. 1	1,687,000	1,662,000
World's visible supply of American, October 11	2,259,000	2,018,000
World's visible supply of foreign, October 11	868,000	897,000
World's visible supply of all kinds, October 11	3,127,000	2,915,000

As to foreign crops, private advices indicate an increase of about 1,000,000 bales over last year, principally in India.

In a booklet entitled "Factory Floor Surfaces," which they have just published, the Aberthaw Company, construction managers, 27 School Street, Boston, Mass., endeavor to place before the building owner and prospective builder, impartial, accurate and intelligible information on one of those questions that inevitably present themselves in connection with industrial building.

The booklet, which discusses the various kinds of floors, will, it is felt, furnish the salient points of floor construction and give sufficient information to enable an owner to discuss floors and floor specifications intelligently with his architect or engineer.

A. B. MacMillan, chief engineer of the Aberthaw company, wrote the book, drawing, it is pointed out, from the company's more than a quarter of a century's experience, in which has been gathered first-hand knowledge of the advantages and shortcomings of all kinds of floors under various working conditions.

This is the second of a series of "Aberthaw Texts," the first being devoted to "Estimating Concrete Buildings." Copies of each volume may be secured by architects, engineers and industrial owners upon application to the company.

Announcement has been made of the purchase by C. G. Sargent's Sons Corporation of Graniteville, Mass., of the good will and business of manufacturing the ball winders formerly made by the North Chelmsford Machine and Supply Company. This winding device is used for winding twine, knitting yarns and similar products and is well known, having been on the market since 1867. This machine was formerly built by the Silver and Gay Company, a concern established in 1832. The new owners advise that they will soon be ready to take care of all orders for repairs for existing machines and to handle orders for new machines. All correspondence regarding this device should be sent to C. G. Sargent's Sons Corporation.

For better good will and higher efficiency

Katherine Hall Y. M. C. A. Department of Ware Shoals Mfg. Co., Ware Shoals, S. C.

KATHERINE HALL
YOUNG MEN'S CHRISTIAN ASSOCIATION
(Department of Ware Shoals Mfg. Co.)

WARE SHOALS, S. C.

June 28, 1924

Brunswick-Balke-Collender Co.,
35 So. Forsyth St.,
Atlanta, Ga.,

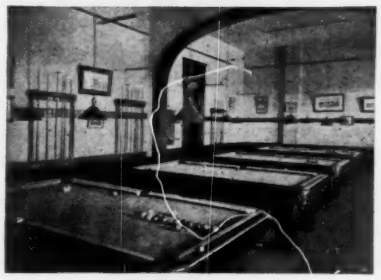
Dear Sirs:

We have your letter at hand regarding the bowling equipment and billiard tables that we have been using for several years.

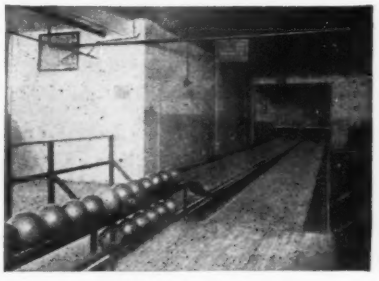
It is right to say that this feature of co-operation between ourselves and employees has brought out benefits that have meant better good-will and higher efficiency, general co-operation and a marked increase in productive lines. There is no doubt but that the equipment held here for the benefit of the employees brings better satisfaction for them, thus helping to solve the labor turnover.

The equipment that we secured of you has given entire satisfaction. The bowling alleys have been used since 1913 and are in good condition now. Two years ago we exchanged the two original tables we had and put in two additional, making four in all and we take this method in expressing our entire satisfaction for the service that we have received from all of these. We can at all times recommend your equipment to any one desiring equipment of the highest type and also equipment that will give the longest term of service.

Very truly yours,
KATHERINE HALL Y.W.C.A.
Jesse D. Brown
Secretary



The Billiard Room



The Bowling Alleys

TO have high class recreation facilities at the disposal of employees at all times during their leisure hours is a PAYING investment for employers.

This is amply attested by the experience of the Ware Shoals Manufacturing Company, Ware Shoals, S. C., whose letter is reproduced above. This firm found that facilities for billiards and bowling in the employees' Y. M. C. A. Department not only "have meant better good will and higher efficiency" but they also "bring better satisfaction for them (employees), thus helping to solve the labor turn-over."

Known everywhere as makers of the world's finest billiard and bowling equipment, The Brunswick-Balke-Collender Company is in a position to assist any employer of labor in working out plans for utilizing these popular pastimes as a means of securing better good will and higher efficiency.

Anyone interested in such welfare work should write direct to our home office. Full information will be supplied promptly and—without obligation.

The BRUNSWICK-BALKE-COLLENDER *Company*
Branch houses in the principal cities in the United States and Canada
623-633 South Wabash Avenue, CHICAGO

NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

W. A. WOODRUFF, who has been general superintendent of the mills of the Bibb Manufacturing Company, at Porterdale, Georgia, has become superintendent of the Columbus mill of the same company at Columbus, Georgia.

J. O. PORTER, formerly superintendent of the Bibb mill at Columbus, has been made agent of the company's mills at Porterdale.

L. R. BRUMBY, who has been assistant general superintendent of the Bibb mills at Porterdale, has been promoted to the position of superintendent, succeeding Mr. Woodruff.

R. K. MATTHEWS, superintendent of the Imperial Cotton Mills, at Eatonton, Georgia, died suddenly at a Macon sanitarium on Saturday, October 11th, following an operation for appendicitis. Mr. Matthews was about fifty years of age, was a trustee of the Eatonton public schools, a member of the city council, and actively interested in all civic enterprises. He had been located at Eatonton for a number of years. Funeral services were held from the First Presbyterian Church of Eatonton, of which Mr. Matthews was a prominent and active member.

S. I. BATCHELOR has been appointed superintendent of the Imperial Cotton Mills, Eatonton, Georgia, succeeding the late R. K. Matthews. Mr. Batchelor has been assistant superintendent for several years.

W. R. MEADOWS, who has been connected with the government, as cotton marketing specialist, Department of Agriculture, and more recently as assistant chief of the textile division of the Department of Commerce, has resigned, and accepted the position of manager of the cotton trading department of the Chicago Board of Trade, Chicago, Illinois.

GEORGE F. PAYNE has been engaged as agent of the spinning mill which Powdrell & Alexander, Inc., will establish in the former mills of the Manhasset Mfg. Company, at Putnam, Connecticut.

L. E. WOOTEN, vice president in charge of the southern sales division of the Lestershire Spool & Manufacturing Company, at Charlotte, North Carolina, has removed his offices to Room 519 in the new Johnston Building.

R. L. HULSEY has become overseer of carding at the Pomona Mills, Greensboro, North Carolina.

A. R. DICKINSON, agent of the Lancaster Mills, Clinton, Massachusetts, has resigned and has become associated as an executive with the Clark Thread Company, Newark, New Jersey.

D. B. MURRAY has resigned as overseer of carding at the Greenville Cotton Mills, Greenville, North Carolina, to become assistant superintendent at the Eastern Manufacturing Company, Selma, North Carolina.

WALTER SMITH has become superintendent of weaving at the Parker Mills, Fall River, Massachusetts. He recently resigned as assistant superintendent at the Wampanoag Mills, of Fall River.

W. A. MURR has become overseer of weaving at the Hannah Pickett Mills, Rockingham, North Carolina.

D. N. CRENSHAW has been promoted to general superintendent a t the Boger & Crawford spinning mill, Lincolnton, North Carolina, succeeding the late H. W. Weidner. Mr. Crenshaw was formerly assistant superintendent.

J. W. KIDD has become superintendent of the Phenix Mills Company, Kings Mountain, North Carolina, succeeding E. A. Smith, Jr., it is reported. Mr. Kidd was formerly at the Thrift Mfg. Company, Paw Creek, North Carolina.

J. T. REEVES, formerly overseer of carding at the Bibb Mfg. Company, Mill No. 1, Macon, Georgia, has become overseer of the card room at the No. 2 mill of the same company, succeeding A. N. McAbee, who has become overseer of carding at the Adams Cotton Mills, Macon.

J. C. MCDOWELL has become associated with the Ware Shoals Manufacturing Company, Ware Shoals, South Carolina, in charge of the finishing department of the bleachery.

E. L. SORD, who has been overseer of spinning at the Waxahachie Cotton Mills, Waxahachie, Texas, has resigned to become overseer of spinning at the Miller Cotton Mills, Waco, Texas.

W. C. WADLO, representative of the Veeder Manufacturing Company, Hartford, Conn., manufacturers of "Veeder" counters, made a trip through the southern territory prior to the Greenville exposition, in October, which he attended. Mr. Waldo visited Birmingham, Atlanta, Charlotte, and other points.

MALCOLM D. LINK has resigned his position as second hand of carding at Laurel Mills, Laurel, Miss., and has accepted a position of overseer with the Worth Mills at Fort Worth, Texas.

"100 and 1 Ways to Save Money with Portable Air Power" is the striking title of a booklet recently issued by the Ingersoll-Rand Company, 11 Broadway, New York City. It illustrates very interestingly the variety of uses of portable air compressors. It describes this apparatus as well as the many air tools and labor aiding methods made possible by them, and in instances gives cost data comparing hand and machine methods. It describes the use of such tools as the paving breaker, "jackhamer," rock drill, trench and clay digger, backfill tamper, etc. The booklet contains 71 pages and more than 100 illustrations showing the various applications. Copies may be obtained upon request to the New York office or any branch of the company.

The Beacon Mfg. Co., of New Bedford, Mass., have placed an order for the humidifying equipment for their new Swananoa (N. C.) Mill with the American Moistening Company, Boston, Mass. This company has also received the order for humidifying equipment for the Mineola Mfg. Co. at Gibsonville, N. C.

Holeproof Hosiery Company

Milwaukee, Wis., U.S.A.

July 17, 1924

Kaumagraph Company,
350 West 31st St.,
New York, N. Y.

Gentlemen:

After using Kaumagraph dry transfers for the last sixteen years, we are thoroughly convinced that this method of identification of our product is one of the best obtainable.

Furthermore, we feel it has proven a good means of protecting the public when purchasing quality goods for which our name stands.

We have, therefore, no hesitancy in recommending Kaumagraph dry transfers for those products to which they are adapted.

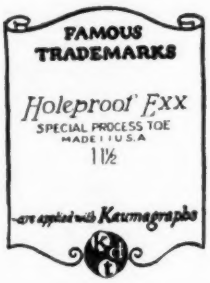
Yours very truly,

HOLEPROOF HOSIERY COMPANY

O. G. Starke

Purchasing Agent

O.G.Starke:nn



THE whole proof of Kaumagraph's superiority in supplying your trademark is the testimonials pouring in from such famous users as the Holeproof Hosiery Company.

One writes: "Kaumagraphs are so much quicker—we mark 80 dozen pairs an hour." Another writes: "It saves in the cost of operation." A third writes: "It's the only method we know of to apply our trademark so legibly and handsomely."

Send for sample markings of Kaumagraph Trademark Transfers that will not wash off, wear off or tear off.

For trademarking hosiery, textiles, silks, etc., use

Kaumagraphs

KAUMAGRAPH COMPANY

350-356 WEST 31st STREET. NEW YORK

Established 1903

Boston, Chicago, Philadelphia, Charlotte, N. C.
Paris, Ont., Paris, France

Simplicity of design and construction; stronger, lighter and absolutely true—these are some of the outstanding features of U S Bobbins and Shuttles that give them superiority above all others. The millions in use today testify to their satisfactory service.

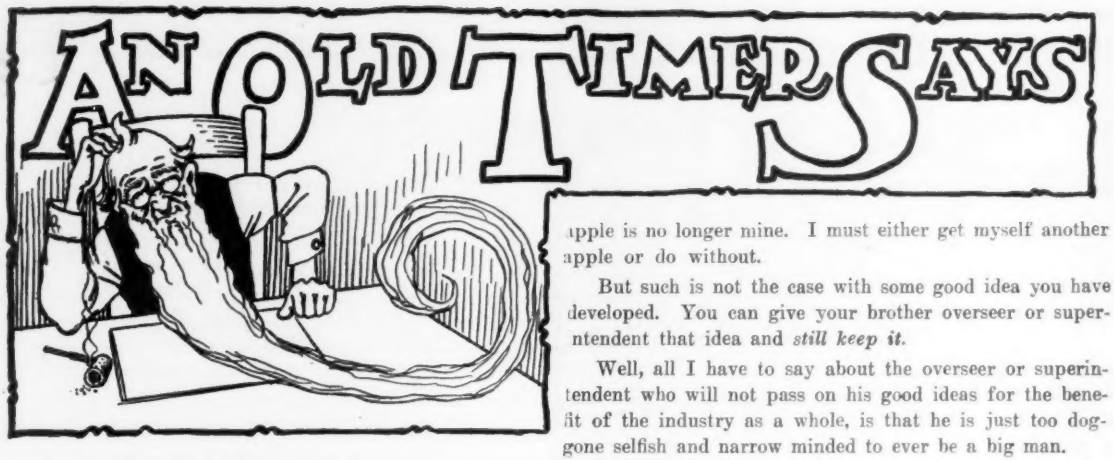
Tell us your bobbin and shuttle troubles—our years of experience are at your service. Write us today and ask to see samples of any U S B & S Co. product.

U S BOBBIN & SHUTTLE Co.

LARGEST BOBBIN and SHUTTLE MANUFACTURERS in the WORLD

Eight Factories

Providence R.I.



Don't know whether you had thought about it or not, but you, my readers, of course realize that you are several thousand instead of just *you*, and "Old Timer" can only hope to interest the majority. It is an impossibility to please you all at the same time. You know the most wonderful man the world has ever known (Christ) could not please all the people.

And again, "Old Timer" has to just bang away at his feature page without having the opportunity of talking or corresponding with you, which you will admit is some handicap.

Of course I do go to COTTON's editors for advice but that generally winds up in a fight. There are *two* of them, and as my beard is rather easy to get hold of, "Old Timer" generally gets licked. Now if I ever happen to the good fortune to catch one of them by himself——*by gum!*

But that isn't what I started to say. I just wanted to tell you frankly that I came to my room tonight with the full intention of letting you have another conversation between my good friend Jim and myself, but on second thought, I decided not to, thinking probably you might get "fed up" so to speak on Jim's experiences. Therefore, I am going to take a shot at you from the blind side.

So here goes, and remember I am shooting at *you* and not any one of the other several thousand above mentioned.

Most everybody knows that most everybody talks too darn much—yet most everybody continues to talk too much.

Rather hard to explain, isnt' it?

A friend of mine in referring to an overseer the other day who had talked too much for his own good, finished his remarks by saying, "Poor fish"! That reminded me of the joke I once read that "A fish never gets caught so long as he keeps his mouth shut."

Think it over!

• • • •

You read and hear a lot of "wailing and gnashing of teeth" about the way to success is to burn the midnight oil. Yes, it is all right to study nights and any other time you can; but real success consists not only in sitting up nights but in being *wide awake in the daytime.*

• • • •

Thank goodness the old prejudice against telling our brother overseers and superintendents how we do certain things in our mills is fast fading away.

Of course if I have an apple and give it to you, that apple is no longer mine. I must either get myself another apple or do without.

But such is not the case with some good idea you have developed. You can give your brother overseer or superintendent that idea and *still keep it.*

Well, all I have to say about the overseer or superintendent who will not pass on his good ideas for the benefit of the industry as a whole, is that he is just too doggone selfish and narrow minded to ever be a big man.

• • • •

Guess you remember the article "Old Timer" wrote about "luck." I heard a fellow "gassing" the other day about how a certain man who had just been promoted, always seemed to play in "luck." It so happened that I knew the man who received the promotion and have been in close touch with his work for several years, so I replied to the gentleman about this way:

"Yes, when I was a young man like you, I saw how 'luck' seemed to just run over some people and I began to make a study of these people. After several years of careful observation I decided that to be 'lucky' enough to get promotion, all an overseer or superintendent had to do was to:—

"Be on his job every minute with that same 'pep' that he had when the job was first given to him.

"Instead of loafing with the crowd, stay at home nights and apply himself earnestly to a study of text books and textile magazines, not only to keep himself up-to-date but to be prepared for the bigger job when it came.

"'Beat the other fellow' in production; make less seconds; have better help by training them better; command more loyalty from employees by being loyal himself and absolutely square in all his dealings with them.

"When told and shown by his employer how certain things must be done—to keep on doing those things and not have to be told and shown again in a few months.

"Instead of trying to 'pass the buck' when things go wrong, shoulder the responsibility he is responsible for and go at his work with the determination to prevent a recurrence of the fault."

The lucky man must work when the unlucky man loafs; hold his nerve when the other fellow loses his; plan and study and keep everlastingly at his job when the other fellow didn't give a damn.

Oh! yes, it is easy pardner—you just do the things the lucky man does and you will be *lucky* too.

• • • •

So many of us confuse "economy" with "*not* spending money." It doesn't mean that at all. *Not* spending money oftentimes means extravagance, as the illustrations I have pointed out clearly show. Sometimes *spending* money, in the *right* way, will be "management without loss or waste," if good judgment is exercised in making that "expenditure."

Easy Money

The laws of supply and demand reflect themselves in the money market as in the markets of all other commodities.

The present low interest rates are due to the large supply of funds available for credit. But Credit will tighten and higher interest rates obtain as capital finds investments.

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Right now, then, is the time to strengthen the financial structure of a business by building *NOW, for the future,* a strong capital position assuring low fixed interest rates and ample working funds.

The Banker is the all important factor in such a structure. His judgment, in times such as the present, is vital to the future welfare of any business. *That he may give sound financial counsel and advice he must have carefully prepared facts and figures.*

Some enterprises *may* succeed without the Banker's aid and influence, but business generally *knows* that this aid and influence is a helpful and sustaining force.

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Color *N* —1.35 lbs. of 1.00 hank = 1,134 yds. = 57.45%

2.35 lbs. 100.00%

Color *BON*—1.00 lb. of 4.00 hank = 3,360 yds. = 50%
Color *B* —1.00 lb. of 4.00 hank = 3,360 yds. = 50%

2.00 lbs. 100%

In the second calculation color *BON* equals 100 per cent, but in the third calculation it equals only 50 per cent. Therefore, the true value of color *BO* is 21.275 per cent, and the true value of color *N* is 28.735 per cent.

In the first calculation *BO* equals 100 per cent, but in the second calculation it equals only 42.55 per cent. Therefore the true value of color *B* is 14.183 per cent, and the true value of color *O* is 7.092 per cent.

Finally, by collecting the percentages, we find

Color *B* = 14.183% plus 50.00% = 64.183%
Color *O* = 7.092%
Color *N* = 28.725%

Total 100%

100% = 5,750 pounds
64.183% = 3,690.52 pounds
7.092% = 407.79 pounds
28.735% = 1,651.69 pounds

In figuring these percentages and weights, the percentage of waste has not been considered, as the amount of waste depends entirely on the conditions in the mill where the yarn is spun. W. A. R. (MAINE)

Oiling Comb Boxes on the Cards.

EDITOR COTTON:

I noticed in the August issue that "Old-Timer" had gone on his vacation, but I observed that he didn't carry his business satchel with him—was just having a rattling good time without any cares of business or worry, which is a very good way, I suppose.

But when I took a small vacation a while ago, I spent most of my time visiting mills to see what the other fellow was doing, and spent a day or so at what they call fishing, but the regular fishermen told me it was too dry for them to bite, which is usually my luck, and we went back to town and bought some sardines and mackeral, and made the best of it.

But during the time I was out and visiting I noticed especially some card comb boxes that had a very peculiar rattling sound—something I was familiar with. But for information I asked the carder how often he cleaned out the comb boxes, and he turned to his card grinder and asked him, and he said, "It's been nearly ten years." I noticed one in particular that was running nicely; the grinder said he had cleaned that out recently. Every now and then, he said, he would clean out the worst ones. Think of an automobile motor running that long without cleaning. The comb is bound to run many, many thousand times more hours than a motor could be run. We clean our auto motors, but they don't produce anything. And yet the card performs a definite work regularly. I guess it's because the card doesn't belong to us while the car does.

I make a practice of cleaning out the card comb boxes every two years, anyhow. If I wait longer the oil grooves get gummed up with the sediment of the comb box oils, and the lubricating qualities of the oil cannot circulate, causing hot boxes. I ran across a triple-filtered oil some time ago that was recommended for comb boxes and guaranteed not to gum up in the box. I've been using it for two years, and from time to time I examine a few boxes, and I have yet to find any gumming. If it doesn't gum, it's the oil for me.

A comb that doesn't perform its function regularly, and evenly will cause variations in the sliver webs, which will ultimately be unevenness in the sliver. It must comb it off smoothly to make an even sliver—and a dry, rattling comb, and its connections, will not comb off evenly.

T. A. D. (GA.)

Cold Process Slashing.

EDITOR COTTON:

The writer read the discussion by "Mack (Ga.)" on "Slashing and Dressing" in the "How Other Men Manage" section of the September issue of COTTON with very great interest. His remarks on cold process slashing were very enjoyable, particularly in that at the present day little or nothing is heard of this method of warp dressing.

It has also been the experience of the writer that in sizing and dressing twines made from spun yarn, and from hard rovings a cold size undoubtedly gives preferable results over a hot size. Also, the resulting color of the sized goods is very much improved, while the starch film is apparently more transparent.

In applying the polishing size for cordage the writer has also had much better success with the use of cold sizes than with hot sizes of any formulae he has tried.

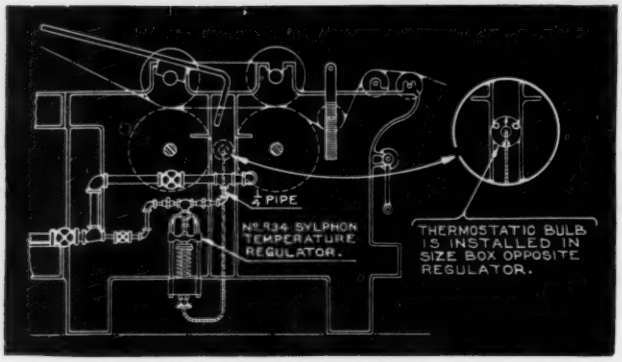
As regards sizing of warps with a cold sizing mixture, it is very difficult at the present day to obtain any information regarding this interesting subject. References to it in any of our textile literature are few and far between, and of course, mills consider it impracticable to try it out with their present equipment.

There are great possibilities in this method of warp dressing, and the writer believes that the difficulties are decidedly not as many as would appear at first glance.

In the first place there would be no difficulty whatsoever in preparing a size with a heavy starch content which will flow readily when cold. The writer has made sizes containing as much as four hundred pounds of starch per one hundred gallons of water, which was perfectly fluid when cold. This strength of a solution of starch would give a much heavier sizing than would be required, but it serves to illustrate that practically any strength of starch size can be made which will flow when cold, which is likely to be used for dressing warps.

Size mixtures could be made on the same formulae as are being used by mills right now with hot size, and the mixture would be readily fluid when cold. It is merely a matter of using a specially treated starch.

As regards penetration, the writer believes that the addition of an extra size box, arranged in tandem (as suggested by "Mack") might go along way to overcome any lack of penetration. In fact, with an actual test it might be found that there would not be much difficulty in this direction. It even might be found that the present slasher equipment would be satisfactory. The speed of the slasher



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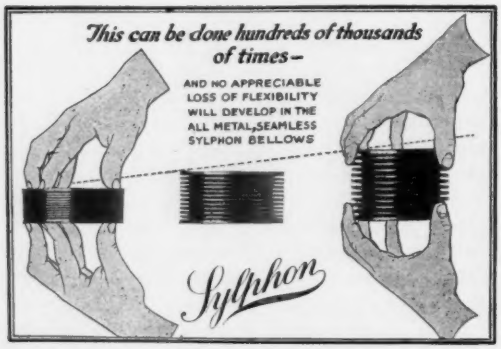
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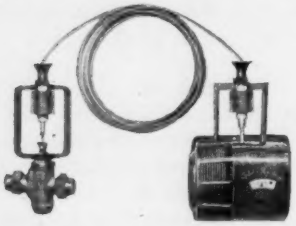

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could be cut down if necessary.

Cold sizing is claimed to produce a very full and soft yarn.

It would seem that there are many advantages to be derived from using a cold size mixture.

First, the strength of the size would remain uniform throughout. There would be no loss of water by evaporation and consequent strengthening of the size, as is the case with size boxes heated with closed steam coils. Similarly there would be no condensed water diluting the size as is the case with size boxes equipped with open steam coils. A circulating system would therefore be unnecessary.

Secondly, it should be extremely economical, as after boiling the size in the kettle, there would be no further steam used. This would necessarily prove a great saving of steam.

Third, the fact that there was no steam used to heat the size in the size box would remove another cause of non-uniformity of sizing, in that there would be no variation of steam pressure to contend with (which causes variations in the sizing) the temperature remaining continually uniform.

Fourth, the life of blankets would be greatly increased.

Fifth, the cold size would not have the tendency to attack the metal parts exposed on the slasher, and in consequence there would be less chance of tendering and staining of the warp.

Sixth, foaming would be altogether eliminated.

It would seem that slashing by the cold process in conjunction with an efficient air dryer would be the ideal method of preparing sized warps. The results should be both excellent and economical if a satisfactory apparatus were developed.

The writer believes that the advantages offered by this process are such that it would pay for very careful experiment and investigation.

The least of the difficulties to overcome would be the preparation of a heavy size that would remain perfectly fluid when cold.

I hope to see further interest shown in this direction.

N. P. R. (ILL.)

The Breaking Strength of Yarns.

EDITOR COTTON:

I notice on page 1164 of the September issue a letter from "E. A. G. (N. H.)," giving the lay-out with which he made a 26s yarn out of 1 1/16-inch cotton, which broke at 70 pounds, and asking what might be done to increase the breaking strength. He said he used a 11-ounce lap; 45-grain card sliver; 55-grain railway sliver; 55-grain finish sliver; .60-hank slubber roving; 1.80-hank intermediate; and a 6.00-hank fine frame roving.

I am sending for his perusal a copy of a bulletin issued by the U. S. Department of Agriculture, showing comparative spinning tests of superior varieties of cotton (grown under weevil conditions in the southeastern states; crop of 1921). If he will carefully examine this bulletin, he will find that the strength of the yarn depends largely upon the variety or kind of cotton with which he starts. Of the five varieties which were tested, one broke at 70.5 pounds, another at 67.2 pounds, a third at 63.5 pounds, a fourth at 62.3 pounds, and the fifth at 56.4 pounds, when making 28s yarn. The new Draper standard for 28s is approximately 69 pounds. The new Draper standard for 26s yarn is approximately 74 pounds. Therefore, "E. A. G.," with his 70-pound break on 26s, came as near to the new Draper standard as was obtained from some of the varieties used in the tests referred to. Of course, strength is not the only factor when considering the quality of yarn. "E. A. G." does not mention other factors such as evenness, etc.

As shown by the bulletin, all the varieties were tested under the same mechanical condition. The weights and sizings were as follows, and compare favorably with those used by "E. A. G.": 14-ounce breaker picker lap; 11-ounce finisher picker lap; 46-grain card sliver; 47.5-grain breaker drawing sliver; 49-grain finisher drawing sliver; .74-hank on slubber; 1.95 hank on intermediate; and 6.22-hank on the fine frame.

(Editor's Note—Copies of the bulletin referred to in this letter may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents per copy, by requesting Department of Agriculture Bulletin No. 1148.)

G. S. F. (S. C.)

The Effect of Increasing Spindle Speed.

EDITOR COTTON:

In reply to "K. D. (Mass.)," who asked for the relative production of two spinning frames, one running 8,700 r.p.m. and the other 9,600 r.p.m., with all other factors the same, I will state that the frames with a spindle speed of 9,600 r.p.m. would produce about ten per cent more per spindle than the frame running 8,700 r.p.m. (Allowing, as he says, that all the other factors are the same.)

In connection with his question, we have conducted some tests in regard to changes in spindle speed, and find that all the factors do not remain the same. Using 1-inch cotton and making 20s yarn, we ran seven doffs on the spinning frame with speeds ranging consecutively from 4,500 to 10,500.

From 4,500 through 7,500, the breaking strength rose steadily in pounds per skein, reaching a maximum at 10,500 r.p.m. On the three lower speeds (4,500, 5,000, and 6,000), it was necessary to use a traveler two numbers heavier than for the higher speeds, or cockled yarn was the result.

From the standpoint of regularity of break and size both, it was determined that 9,500 r.p.m. was the best speed, and as "K. D." would increase his production ten per cent at this speed, it looks like a good bet for him.

G. T. (S. C.)

EDITOR COTTON:

Replying to "K. D.," who wants to know the difference in production of the same spinning frame between a spindle speed of 8,700 r.p.m. and one of 9,600 r.p.m. I worked this out as follows:

$9{,}600 - 8{,}700 = 900.$

$$\frac{900 \times 100}{8{,}700} = 10.43 \text{ per cent increased production.}$$

Of course you understand that there will be a slight decrease from this figure due to the increased number of doffs per week. This increased spindle speed will also

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give a slight increase in strength. In experimental work it has been found as a general rule that the strength increases with the increase in spindle speed.

A. T. (S. C.)

Reducing Friction on Drawing Frames.

EDITOR COTTON:

The accompanying photograph illustrates an application of ball bearings which, to me, is a brand-new use of these friction-reducers. I came across it in a mill the other day.

The ball bearings have been applied in this mill to the driving shaft of the drawing frames, as shown in the picture. The small bearing at the right of the picture is plainly seen, while the real need for a ball bearing application is at the bearing at the left-hand side, on the rail between the two large driving pulleys.

Owing to the great condensation performed at the drawing frame, and due to the compactness of the machine itself, there is a great strain on these bearings, as it is necessary to keep the short driving belts very tight or under a high tension in order to keep them from slipping. With the usual form of design—this is what the carding superintendent told me—all the shafts were oiled with an ordinary oil can and by gravity, requiring that the oil hole be located in the top or cap portion of the bearing box. This was intended to facilitate the flow of the oil down around the shaft. If the bearings had no great strain upon them, this was satisfactory, but in the case of the driving end of the drawing frame, the tension of the belts would pull the shafts so tightly against the oil hole in the top portion of the box that no oil could flow down around the shaft, and as a result the box and shaft quickly heated and wore out.

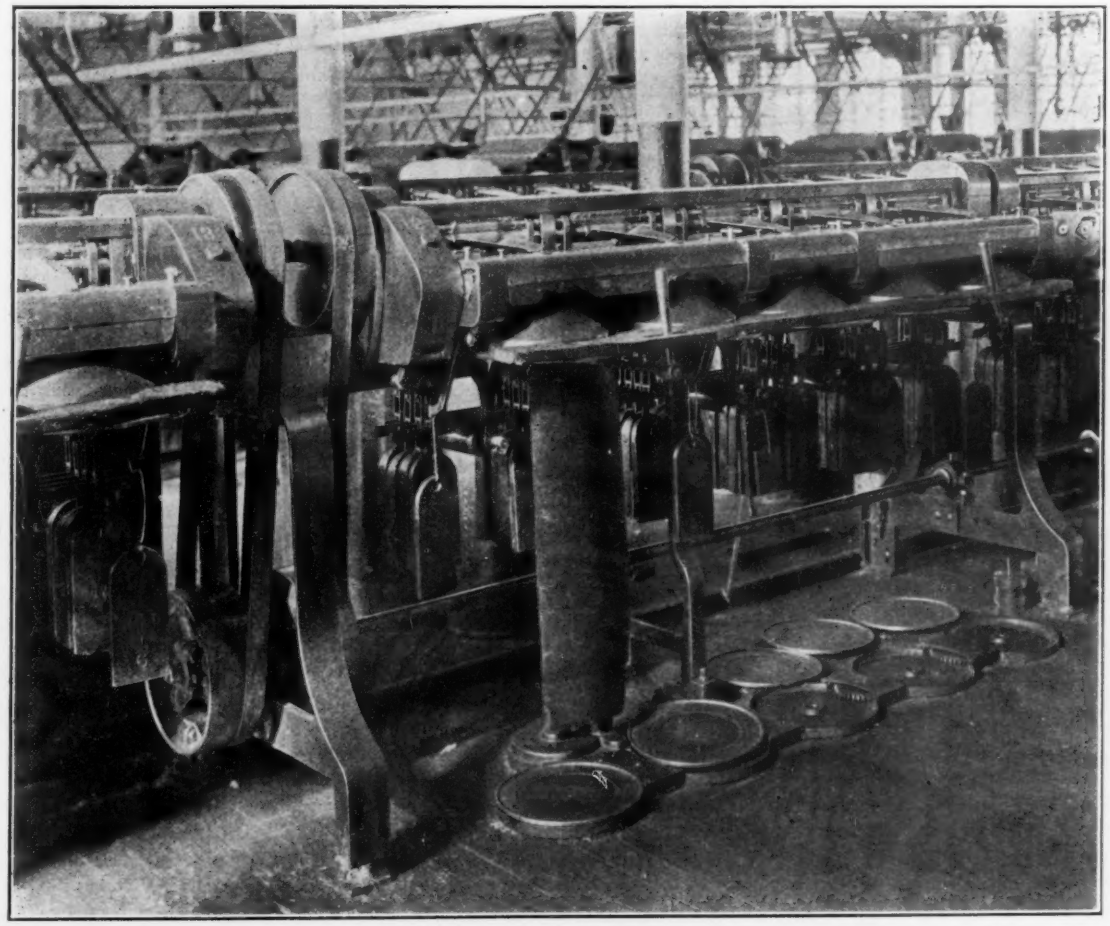
That the use of the ball bearing application here overcomes these conditions is obvious. I pass this information along to your readers for such interest as it may be to them.

BOB (GA.)

Some Further Slashing Discussion.

EDITOR COTTON:

I have read "T. A. D.'s" article in the September issue of COTTON on slashing and sizing, and am still inclined to do a little more of what he calls "criticizing." In the first place, I will call your attention to the reply "T. A. D." makes to "Contributor No. 14," who asked how often strings should be put in between sections. "T. A. D." tells us he puts in strings according to the number of laps he cuts on the warper beams. Well, with an experience of forty years behind me on all kinds of white work, I'll have to be shown wherein laps have anything to do with ends getting on other sections at the front of the slasher. Nearly all mill men know that when one cuts a lap on any sec-



tion beam, that thread will, if put up correctly, be stuck or twisted onto its mate on the same beam, and when it reaches the front will still be in its proper place insofar as the splitting rods are concerned. But the chances are 100 to 1 against its being in the dent it occupied formerly, or before it lapped. Will "T. A. D." or someone else please tell us how these strings and rods separate laps that have been cut and put up on the same beam?

My idea of occasionally putting in strings at the beginning of the loom beam would be to be certain there were no ends running on the wrong section. These are caused by hard places on the yarn; sometimes a little stringy or taped place from a wet spot will cause an end to break and go over to another section. But most all these things happen at the front of the slasher and are not caused by laps. If the size is properly made and the tensions are about right, there should be no need for putting in strings more than twice in a set of 30s yarn.

I do not understand "T. A. D." when he says there will be no two ends together. Does he, when starting up a set, strike the tape comb, send the tapes through, lay them in, and when the split rods are inserted, has he one end in each dent from each individual section? I've never seen this done so fine, without counting in from the front. If you will look on any ordinary slasher you will find, if five beams in the set, probably six threads in the dent of the raddle at the front, and two ends from any one of the sections here and there across the sheet, which is no real detriment.

I still hold to my original statement regarding "lease." "T. A. D." states that anything that separates is a lease; I hold that the exact opposite is the case. A lease is to hold in place. If "T. A. D." had been up against as many snags as I have, receiving warps and chains with both leases broken at the dyehouse, having to be beamed just the same, he would understand that a dividing string is not a lease.

Going back a few months, we remember that "T. A. D." had quite a time with slack ends on sections. Now poor warping of that kind is just one great cause for the ends getting onto other sections at the front of the slasher—but it is almost never from cutting laps.

MACK (GA.)

Finishing Grey Silesia.

EDITOR COTTON:

I am desirous of securing, through "How Other Men Manage," a formula for finishing grey silesias similar to the accompanying sample; also an outline of the machinery required, and an idea of what is considered a fair output per day for this class of work. I shall appreciate having some of your readers answer. C. K. (WIS.)

EDITOR COTTON:

Replying to "C. K. (Wis.)"—

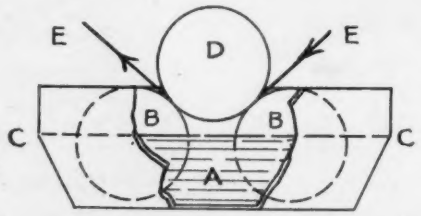
Make a bath with equal weights of logwood extract and water. Dissolve in it 62 pounds of potato starch and 48 pounds of wheat starch, and add 6½ pounds of lard, and also a solution of one pound of bichromate and ½ pound of sulphate of copper in boiling water. Then boil up and when the liquid begins to thicken, add the necessary amount of iron salt to mordant the logwood and boil under pressure until a sample of the fluid has a uniform viscid consisteney. The finished dressing is applied to one or both sides of the fabric as desired. After leaving the starching machine the goods are dried, with or without stretching. Only inferior qualities are dried on the hot cylinders as they give the material a harsh coarse feel. This effect, however, may be partially avoided by increasing the quantity of lard in the size.

After drying the goods are allowed to get perfectly cool and are then sprayed with water. Sprinkling will not do as large drops of water will cause stains. Then leave for five or six hours, and calender cold, regulating time and pressure according to the effect desired. The greater the required luster, the heavier must be the pressure. These and all twill goods for black must be well scoured and singed twice on the face and once on the back and the mixing must harmonize with the color of the fabric, which must be dyed grey first. The goods can be dyed a light grey first with logwood and soda and rinsed and finished with copperas and soda. Keep alkaline or they will turn red.

According to the English style, goods like the sample submitted by "C. K." are dyed with aniline grey first and then run in size as below, and are something like this in the grey:

Length	70 yards
Width	41 inches
Counts per sq. in.	76 x 96
Weight	15½ pounds
Finished width	39½ inches

After dyeing and mangling the cloth is dried on the drying machine and allowed to cool. It is then conditioned on the damping machine and allowed to stand for two hours, after which it is warm swiss mangled in a six-bowled calender, using a medium pressure. After calendering the cloth is filled on a patent filling mangle, using a 36-pound weight on each lever, with the following mixture:



White dextrin	160 pounds
Corn starch	60 pounds
Oleine oil (50%)	2 gallons
Carbolic acid	¼ pint

Water sufficient to make, when boiled 100 gallons.

After filling the cloth is stretched on a clip stretching machine and then dried on a drying machine and allowed to cool. It is afterward conditioned on the damping machine, and allowed to lie for two hours, after which it is warm swiss calendered on a three-bowled dead set calender, using medium pressure. The cloth is then stretched on a belt stretching machine, and again passed twice through the calender, after which it is ready for making up.

In the patent filling mangle, a rough sketch of which is shown herewith, the starch is in the box *A* and covers the brass bowls *B* and *B* to the line *C C*. The rubber roll *D* squeezes the starch off and the cloth *E E* passes through in the direction of the arrows. The machinery required

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Club Breakfasts, 60c, 70c, 80c, 90c, $1.00
Table d' hote Dinners, $1.00, $1.25, $1.50

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Write for descriptive booklet CM.

is all mentioned, viz., sewing, singeing three times, scouring well, i.e., once boiled, washed soured and dyed four times grey, wash, mangled, dried twice, damping machine, six-bowled calender three times, patent mangle, clip stretching machine twice. It will take about one minute to run the silesia once through each machine. The first, or American, idea is the best, the cheapest and the quickest.

W. B. (MAINE.)

They Don't Always Tell Us.

EDITOR COTTON:

I noticed in reading "The New England Mill Situation" in the September number of COTTON, what is said in regard to the wide sheeting situation—that the Naumkeag of Salem, Mass., and the Pepperel of Biddeford, Maine, sold stock goods at low prices in order to keep running.

The Lockwood Company, of Waterville, Maine, which produces about all wide sheetings, was not mentioned. Now, I don't think this company reduced the price of their wide goods in order to keep them moving. And they have been running very near full capacity on wide goods all summer and are now, at the present time, running full time on their wide sheetings, with orders ahead.

The reason I am writing this to you is because I never see the Lockwood Company mentioned in your paper when wide sheeting mills are mentioned.

We do not care to take our hats off to any wide sheeting mills in New England, New York State, or the South—Naumkeag included—in regard to quality of goods. Lockwood brands of wide sheeting are known all over the United States for their superior quality. I would ask that in future articles on wide sheetings they be given favorable mention. I am not writing this with the intention of getting a lot of advertising out of the article for the Lockwood Company, but just to let you know that there is such a company, away up here in Maine, that is doing a very prosperous business—as hard as times are elsewhere—with a mill of 90,000 spindles and wide sheeting looms running full-time.

PINE TREE STATE (MAINE)

Organizations for 1¼-inch Staple.

EDITOR COTTON:

I should be glad to receive, through "How Other Men Manage," from some men who are running 1¼-inch staple, the following information concerning their "hang-up":

Settings of beaters in the picker room.

Speed of beaters in the picker room.

Setting of cards.

Production of cards.

Settings of rolls on drawing, both front and back.

Settings of rolls on all fly frames, three processes.

I would also like to have the weight of laps, weight of card sliver, weight of drawing, and number of hank roving on all three processes.

CONTRIBUTOR No. 31.

EDITOR COTTON:

In response to "Contributor No. 31," a copy of whose letter was submitted to me, I am pleased to give you herewith the information requested concerning settings, etc., for 1¼-inch cotton.

I use two processes of picking. On the breaker, I set the beater to 3/16 inch, running it a speed of 1,050 r.p.m. I have the carding or Kirschner type beater on the finisher, and set it ⅛ inch, running it at a speed of 850 r.p.m. My card settings on this work are as follows:

Feed plate to licker-in	10/1000
Mote knives	10/1000
Licker-in to cylinder	7/1000
Back knife plate	17/1000
Front knife plate	17/1000
Screen to cylinder	22/1000
Flats to cylinder	9/1000
Doffer to cylinder	7/1000

The production of my cards is 65 pounds in ten hours.

On the drawing frame, the roll settings are: front to second, 1 7/16-inch; second to third, 1⅝-inch; third to fourth, 1⅝-inch.

On the slubber: front to second, 1 7/16-inch; second to third, 1½-inch.

On the intermediate: front to second, 1 7/16-inch; second to third, 1½-inch.

On the roving frames: front to second, 1⅜-inch; second to third, 1 7/16-inch.

On the jacks: front to second, 1⅜-inch; second to third, 1 7/16-inch.

The weight of my breaker lap is 15 ounces to the yard, and the weight of my finished lap is 12 ounces. My card sliver weighs 45 grains, and the following are the weights made on the succeeding processes: Drawing, 62-grain sliver; slubber, .55 hank roving; intermediate, 1.25 hank roving; roving frame, 3.25 hank roving; and jack frame, 10.00 hank roving.

I trust this information will assist "Contributor No. 31."

J. K. (N. C.)

EDITOR COTTON:

Replying to the questions of "Contributor No. 31," an advance copy of which was submitted to me, I will answer his request for information as to settings, drafts, etc., in running 1¼-inch cotton by giving him this information from our own plant.

Our organization for making 40s, 50s and 60s yarns from 1¼-inch staple is as follows:

We use the same organization for each number up through the drawing frames. The sizings, doublings, and drafts for each number are shown below:

PROCESS	DRAFT	DOUBLING	SIZING
Opener-breaker picker			16 oz.
Intermediate picker	4.55	4	14 oz.
Finisher picker	4.48	4	12½ oz.
Card (7% waste)	118	1	43 grains
Sliver lap	1.75	20	490 grains
Ribbon lap	4.35	4	450 grains
Comber (8 heads) (16½% waste)	64½	8	46 grains
First drawing	5.1	6	54 grains
Second drawing	5.4	6	60 grains
For 40s			
Slubber	5	1	.70 hank
Intermediate	6	2	2.10 hank
Fine Frame	7	2	7.30 hank
Spinning	11	2	40s yarn
For 50s			
Slubber	4	1	.56 hank
Intermediate	4.75	2	1.33 hank
Fine Frame	5.25	2	3.49 hank
Jack Frame	5.75	2	10.00 hank

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Spinning	10	2	50s yarn
For 60s			
Slubber	4.25	1	.59 hank
Intermediate	5	2	1.47 hank
Fine Frame	5.50	2	4.00 hank
Jack Frame	6	2	12.00 hank
Spinning	10	2	60s yarn

Pickers.

The cotton is run through a bale-breaker and allowed to condition over night, then run through an opener-breaker, intermediate, and finisher picker.

The opener-breaker is equipped with a porcupine beater. This beater is set 3/16-inch from the 3-inch feed roll. The distance of the beater from the top of the grids is 7/16 inch and from the bottom, 13/16 inch. The speed of the beater is 950 r.p.m., and the speed of the feed roll is 9 r.p.m., giving 11¼ blows per inch. The speed of the fan is 1,145 r.p.m.

The speeds and settings on the intermediate and finisher pickers are the same. The intermediate and finisher picker are equipped with a two-blade knife beater. This beater is set 3/16 inch from the 3-inch feed roll. The distance of the beater from the top of the grids is 7/16 inch and from the bottom ¾ inch. The speed of the beater is 1,200 r.p.m., and the speed of the feed roll is 5¼ r.p.m., giving 49 blows per inch. The speed of the fan is 1,203 r.p.m.

Cards.

The cards are set as follows:

	Gauge
Feed plate to licker-in	10
Mote knives (top)	12
Mote knives (bottom)	10
Licker-in to cylinder	7
Back plate to cylinder (top)	27
Back plate to cylinder (bottom)	34
Flats to cylinder (back)	9
Flats to cylinder (center)	9
Flats to cylinder (front)	9
Front plate to cylinder (top)	24
Front plate to cylinder (bottom)	34
Doffer to cylinder	7
Doffer comb to doffer	22
Licker-in screen (front)	29
Licker-in screen (back)	1/16″
Cylinder screen (back)	29
Cylinder screen (center)	34
Cylinder screen (front)	3/16″

The speeds of the cylinder, licker-in, and doffer are: Cylinder, 168 r.p.m.; licker-in, 453 r.p.m.; and doffer (27 inch), 9 r.p.m. The production is 76 pounds per card per day of 10 hours, three per cent allowed for stripping, making a 43-grain card sliver.

On the sliver lap machine, using metallic top rolls, 1⅜-inch diameter, the settings are (center to center): first to second, 1⅝-inch; second to third, 1 15/16 inch. The speed of the 5-inch calender roll is 106 r.p.m.

On the ribbon lap machine, using metallic top rolls, 1⅛-inch diameter, the settings are (center to center): first to second, 1 7/16-inch; second to third, 1⅝-inch; third to fourth, 1 13/16-inch. The speed of the 1⅛-inch front roll is 298 r.p.m.; the speed of the 5-inch calender roll is 83 r.p.m.

Comber.

The settings on the comber are:

Cushion plate to detaching roll (steel)	1 5/16 inch
Feed roller to steel detaching roll	1⅞ inch
Angle on nipper knife	36 degrees
Nipper knife to half-lap	21 gauge
Segment to steel detaching roll	1⅛ inch at 5
Top comb to segment	21 gauge
Top comb angle	28 degrees
TIMINGS:	
Detach at	6
Feed at	5

The draw box settings (leather top rolls) are, center to center: first to second, 1½ inch; second to third, 1⅝ inch; third to fourth, 1¾ inch. Nips per minute, 120.

On the drawing frame, the roll setting, center to center, are: first to second, 1½ inch; second to third, 1⅝ inch; third to fourth, 1¾ inch. The front roll speed is 282 r.p.m.; and the speed of the back calender roll is 260 r.p.m. The diameter of the rolls, which are metallic, are: Back calender roll, 2 inches; first roll, 1⅜ inch; second roll, 1⅛ inch; third roll, 1⅛ inch; bottom, 1⅜ inch.

On the fly frames, the roll settings, center to center, are:

	1st to 2nd	2nd to 3rd
Slubber	1 7/16 inch	1 9/16 inch
Intermediate	1 7/16 inch	1 9/16 inch
Fine	1⅜ inch	1½ inch
Jack	1⅜ inch	1½ inch

The speeds and hanks are:

	Hank	Front Roll R.p.m.	Spindle R.p.m.	Twist Per Inch
For 40s				
Slubber	.70	160	572	96
Intermediate	2.10	160	890	1.59
Fine	7.30	119	1,290	3.24
For 50s				
Slubber	.56	185	540	.78
Intermediate	1.33	199	880	1.25
Fine	3.49	172	1,290	2.24
Jack	.10	109	1,575	4.1
For 60s				
Slubber	.59	183	521	.76
Intermediate	1.47	186	868	1.32
Fine	4.00	166	1,290	2.33
Jack	.12	106	1,574	4.21

The diameters of the fly frame rolls are:

	First	Second	Third
Slubber	1 3/16 inch	1 inch	1 inch
Intermediate	1⅛ inch	1 inch	1 inch
Fine Frame	1 1/16 inch	1 inch	1 inch
Jack Frame	1⅛ inch	1 inch	1 inch

On the spinning frames the roll settings, center to center, are: Top, first to second, 1 5/16-inch; second to third (fixed), 1¼-inch. Bottom, first to second, 1¼-inch.

Speeds:

	40s	50s	60s
Front roll	80	72	65
Spindle	7,200	7,196	7,126

Twist: 4.50 × square root.

Traveler: For 40s, 9/0; for 50s, 13/0; for 60s, 15/0. Using a No. 2 flange ring.

I trust the foregoing will be of help to "Contributor No. 31" and any other readers who may be working a staple of this length. G. T. (S. C.)

A Loose or a Tight Gauge.

EDITOR COTTON:

I have often wondered just what many overseers and grinders mean by the phrase, "set to a tight 9 or a loose 9." You may ask some of these men "What have you got your flats set to?" and he will reply something like this:

"I set to a loose 9."

You may ask another man the same question and he would say:

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"Why I set my flats to a tight 9."

Now what I cannot understand is, where do they get this loose 9 or tight 9 stuff?

If you use a No. 9 gauge and do not set to it, there is no use using it at all, for if you set to a loose 9, you are not setting to a 9 at all, but are setting to something like a 10 or 11, and if you set to a tight 9 that you can hardly pull through your flats, then you are setting to about a 7 or 8 gauge; but still, these men will tell you they are setting to a No. 9. Now with 4/1000 difference between these two men, how in the world can both be setting to 9/1000? By my way of setting up a card, neither of them have their flats set to a No. 9, but are both wrong. We have the gauge to go by, why not go by it? For there is no such thing as a loose or tight setting and both be called the same gauge.

You cannot pick up a man just any day and put him in charge of your cards and expect him to set them right, for no card grinder is made overnight, and when it comes to setting up cards, it takes years of study and practice to do it right; so why do the mills not pay a good man a good salary when they get hold of one and keep him, instead of always changing first to a loose gauge and then to a tight gauge man, for there is no such a setting?

B. A. B. (N. C.)

Predicts Changes in System.

EDITOR COTTON:

Recently I visited a mill that has the stationary flat cards in operation, and although I know I am going to bring much down upon my head by the following, I really believe that the change in our carding system was a mistake, as much so as the adoption of the bobbin-lead system over the flyer-lead.

I am convinced that owing to a longer draft and a much higher speed, the revolving flat card takes the life from the staple of the cotton. The only objection to the American system is the railway head, which is as defective as the bobbin-lead fly frame. But the sliver can be drawn from ten cards the same as the slivers on the comber.

The old system of carding makes a much better yarn in every way, and let me say there are many men at present working hard to invent a machine that will replace the railway head. Why are these men working on this old system, and what is their aim?

(1) They know that the stationary flat cards make better work. (2) The doublings are 10 to 1, which is something to consider, for from the birth of the cotton industry we have doubled at every opportunity, which of course helps to eliminate the defective places. (3) The sliver is much lighter and has not received the same severe treatment as on the revolving flat card. (4) With the English system we make the work heavy in the preceding processes and then have (in most cases) excessive drafts in the succeeding processes.

The time is not far off when we will adopt a very light card sliver, double the number of cards, and thus eliminate the second intermediates and jack frames. Even the spinning will be equipped with four lines of drawing rolls instead of three, and will draw about 42 inches.

WASH (R. I.)

Card Room Kinks.

EDITOR COTTON:

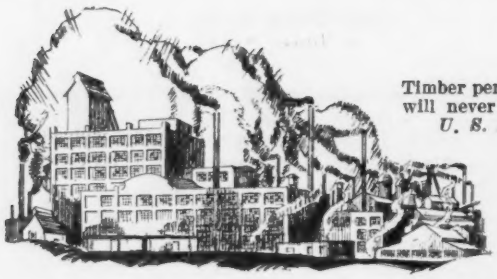
In reading R. A. Soniaman's article in the September issue of COTTON, I find several questions of interest on which I shall try to write a few lines.

Mr. Soniaman asks how to keep carded and combed work from becoming mixed. He suggests painting a strip around the top of the sliver cans to designate between the two. My suggestion would be to have some bands made from a narrow tape, say about $\frac{5}{8}$ of an inch wide, fastened around the sliver can by means of Gap buckles fastened to both ends of the tape by rivets. A cheaper method would be to have a piece of elastic banding sewn to the tape to keep it snug against the can. These bands may be dyed any suitable color, and different colors used for the different grades. Either of these bands is easily taken off of or put on the sliver cans. I have seen this method prove highly satisfactory in a mill running eight different grades of cotton separately. Chalk marks, on the slubber roving and jack roving, are used to correspond with the color of the bands.

Coming to the sliver lap machine, trouble is sometimes experienced by the knock-off spoons not knocking off soon enough. This trouble may be remedied by adding a little more weight to the end of the spoon so that when an end breaks, the spoon will fall and be tripped immediately. Special care should be taken of all knock-off motions or there will be trouble in the sizings. Laps should not be made too hard, as this is likely to cause a good deal of licking up. I do not approve of large laps as the end slivers generally slip off the sides of the lap, causing waste. I have seen laps made so hard that the sides were burnt. A perfect lap is not easily made on the old sliver and ribbon lappers. Some fellows remedy soft laps by putting acid or belt grease on the brake-bands when the trouble is that the frame is not perfectly leveled and lined up. Laps hard on one side and soft on the opposite side can be remedied by re-setting the lap guides that regulate the selvage.

Sliver laps should be sized once daily and the ribbon laps twice daily. Records should be kept of all sizings, and the sizer should be a responsible person, either the section hand, or one who is detailed to do nothing but size in the different processes of the carding. A variation of more than 2.5 per cent should not be allowed. If the sliver lapper sizes wrong the trouble will be either in the pickers or possibly in the cards, if any changing is done on the cards. On the ribbon lapper, wrong sizings may be altered by changing the draft gear. One tender to a ribbon and sliver lapper is a good layout, where the ribbon lapper front roll speed is 500 r.p.m. making a 600-grain lap. The section hand should look after oiling and repairs. Lap storage is poor policy as laps are easily damaged.

In a certain mill making high counts, the combers are run 102 nips on the Nasmith, and 124 on the Whitin. I noticed that practically all the stop signals were out of order. Six combers to a tender is the allotment in this mill. Laps should not be run out evenly as the piecings will all come together. As for comber tenders allowing lap tails to run through and break needles, if the ribbon tenders are careful to lay the lap evenly across the bobbin when they start a new lap, the needles would not be broken,



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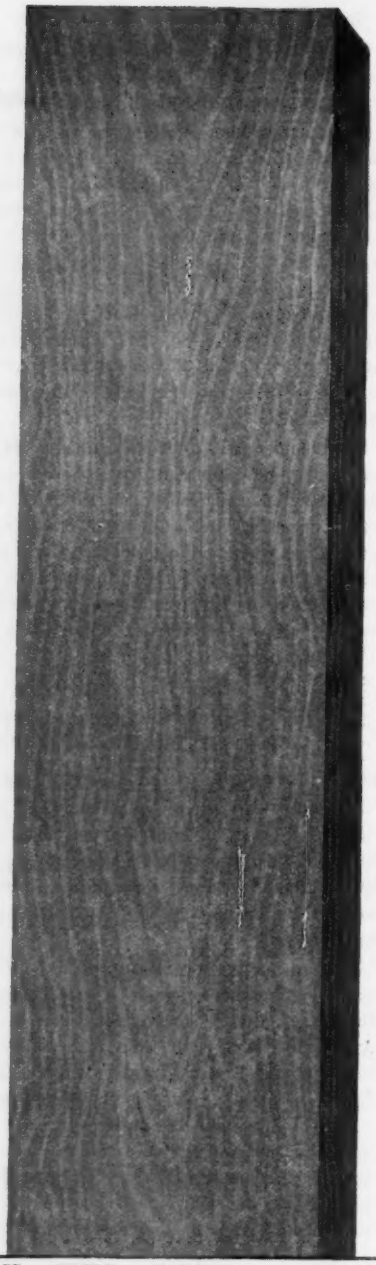

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even if the tail-end were allowed to run through.

An average comber waste percentage ranges from 14 to 18 per cent. I have seen 22 per cent taken out of a high grade Sakellarides with no better results than if 18 per cent were taken out. Waste percentages should be taken and checked from each comber once a month. A comber should be taken down and thoroughly scoured and re-set once a year. In a large room it would be wise to detail a man to do nothing but straighten needles in the top combs and half laps and renew when necessary; he could also do the oiling.

Spring bottom cans have their advantages and disadvantages. All I will say is that they make a handy waste and garbage receiver under the spring cover.

The comber draw-head rolls in the mill I visited are varnished once a month, the front rolls being done once every two weeks and the detaching rolls are varnished every week and renewed every six weeks. They have great trouble at this mill in keeping the electrical stop-motions in repair, the mechanical motion being liked much better.

This mill considers two processes of drawing sufficient after combing; three for carded work. The drawings, both breaker and finisher, are sized three times daily, records being kept. A variation of two per cent is allowable. All drawing roll clearers should be picked at each doff.

Mr. Soniaman's articles are good, and it would be interesting if a number of readers would answer, in letters to the discussion department, some of the questions he propounds as his series proceeds. W. O. R. (MASS.)

Notes on Dust Rooms and Flues.

EDITOR COTTON:

At one or two of the meetings of the Southern Textile Association, there has been some discussion with reference to the size and capacity of dust rooms. I am giving you in this letter some information on this subject that may be of interest to superintendents and overseers of carding.

The area of the flue leading from a dust chamber to the open air should be equal to seven times the area of all the openings going into the dust room from the fans. That is, find the area of all the fan openings, the inlets from the vertical openers, condensers, and all other openings feeding into the dust room. Add these areas together, and then the area of the outlet flue should be seven times the sum of these. This is true, regardless of the speeds of the fans going into the dust room.

Furthermore, the overseer or superintendent has doubtless noticed, when he is down in the dust room, that the delivery elbows from the various machine outlets were sticking down below the floor and were turned in some direction. It is rather a habit with erecting men to point all these delivery elbows toward the uptake or draft chimney from the dust room. In my opinion, this is just about as wrong as they could possibly do it, as with all these elbows turned toward the draft flue, it creates a tendency to make a regular blast of wind in that general direction regardless of the size of the dust room. As a matter of fact, the dust room is supposed to act as an expansion chamber for the exhaust air, and these elbows should be turned in a variety of directions—in fact, in almost any direction rather than toward the uptake flue. The tendency then is to break up these air currents by allowing them to impinge on a variety of surfaces such as walls or pillars, or either to come in contact with other currents of air and by breaking up these air currents and killing their velocity it gives them a tendency—and a strong tendency—to drop any material they may be carrying, and by reducing this velocity to a very low point, it prevents these currents from again picking up dust or cotton or other matter and carrying it to the chimney.

If any of your readers are having trouble with lint or cotton being blown out into the mill yard from the dust room, it will pay them to bear the foregoing thoughts in mind and investigate the arrangement of the pipes into the dust room. If these are properly arranged, as suggested, it will help remedy this trouble.

Of course, if a man's dust room flue is already too small, and he is having much stuff thrown out, it is doubtful whether this breaking up of the air currents will be of sufficient aid to entirely eliminate the trouble. But whether the flue is large or small, attention should be paid to this item because it is an advantage—and a big advantage—to utilize the dust room as an expansion chamber only and to utilize every part of it for that purpose, and avoid the creating of violent drafts in the direction of the flue or uptake chimney.

And just as a matter of general information, it is well to remember the rule—the area of the flue leading from a dust chamber to the open air should be equal to seven times the area of all the openings going into the dust room from the fans. BOB (GA.)

Efficiency and Progress.

EDITOR COTTON:

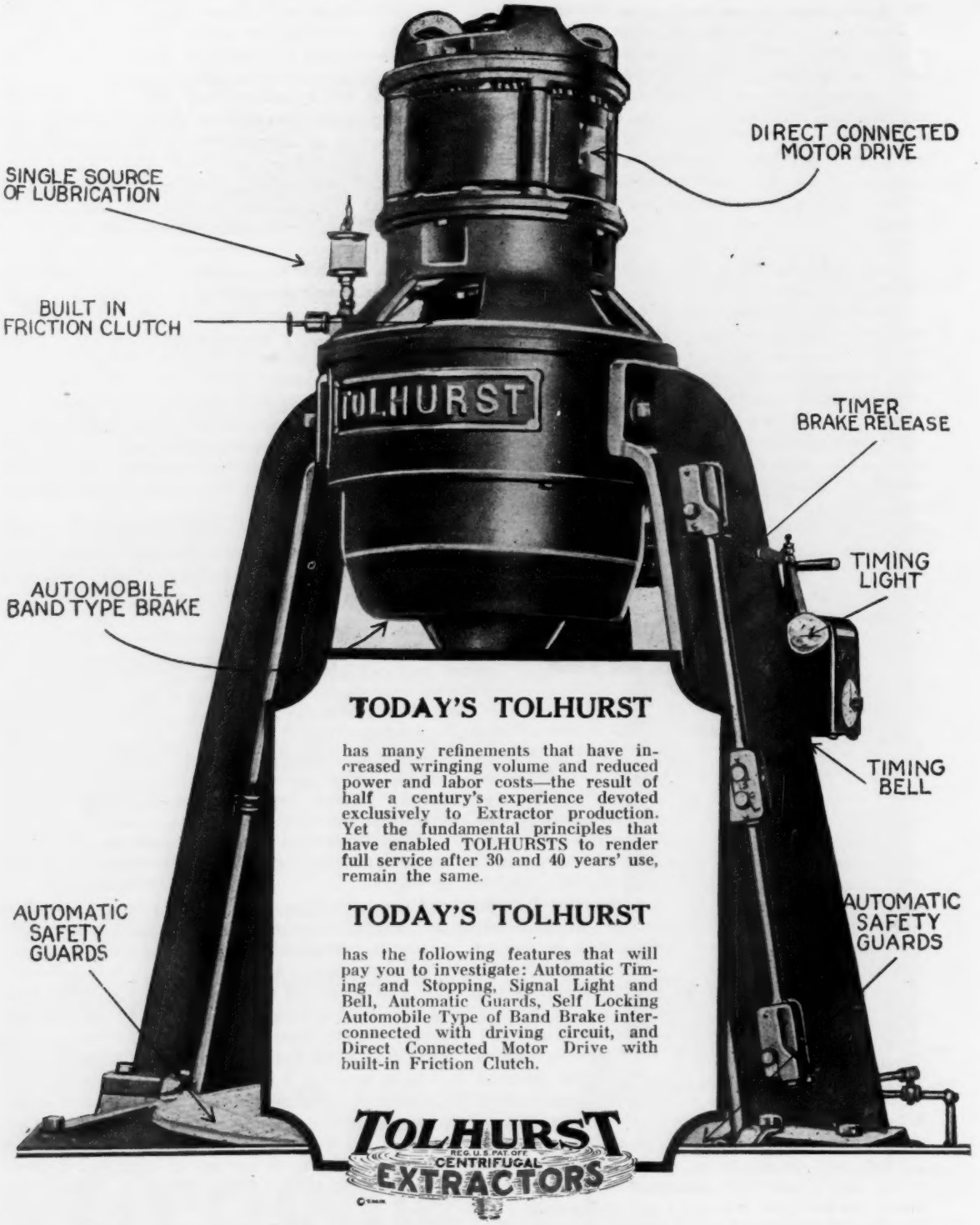
Reading "Wash's" article on making changes in the organization, in the May issue, and "Christy's" letter upholding the research man, has prompted me to get in and write a few words of opinion formed by reading and summing up experience on this matter.

"Wash" states that we hear very little now of efficiency engineers, due no doubt to the fact that they failed in necessary service.

The word "efficiency" is defined to us as coming from the Latin *efficio* (*ex-facio*), which means, "I do thoroughly, completely, triumphantly." Therefore, a man is efficient in his work when he devotes his energies to its tasks with such wisdom that all are properly and successfully done. To my way of thinking, everyone from the manager down to the lowest-paid worker in the mill, if he or she is devoted to the work in this manner, is an efficiency engineer.

Today efficiency is thought of in technical terms as the maximum of result produced by the minimum of energy. As an illustration, an engine which utilizes only 20 per cent of the energy in the coal it consumes is said to be only 20 per cent efficient, as 80 per cent of the energy is wasted. A machine 100 per cent efficient has never yet been invented, and probably never will be, but to reduce the waste of energy or waste of material in any industrial process is a problem upon which we must always be at work.

A case to my knowledge was of a chief engineer being employed at a mill I know of and saving the mill several thousands of dollars in coal by improved methods over those of his predecessor. To my way of thinking, this man is an efficiency engineer.



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Cotton manufacturing is conducted for the purpose of making money to be distributed between employer and employee, and to make a material of such quantity and quality as to satisfy the buyer's wants. Unless the mill pays it will soon go to the wall, and both employers and employees are the losers. Fine equipment, fine mills and fine manufacturing theories are useless, therefore, unless they are economically managed. No efficiency engineer, industrial engineer, research man or other person under any other title can be a success unless he knows how to measure the results of his efforts in terms of money.

There is a vast difference in demonstrating the truth of a manufacturing principle in the commercial way so as to secure a financial return. When eliminating cost we must look out that we do not impair production and quality and good running work. I think this is the failing of many efficiency engineers who come into this field with interesting theories of shop management, pay systems and the like, and is one of the reasons why the movement commonly known as scientific management stands discredited in the minds of many men.

I agree with "Wash," efficiency engineers or efficiency experts came into the mills and found that the overseers and superinetndents knew more than they themselves did. They come to the mill with assurances that they can eliminate this and that process and save the mill thousands of dollars. At the present time the well managed mills which are spending thousands of dollars putting in machinery to improve the quality are the ones that run during times of depression.

I always remember a little paragraph I read in COTTON several years ago: "Little wastes in great establishments constantly occurring may defeat the energies of a mighty capital." So I think it is up to us overseers and superintendents to be the efficiency experts and research men in our own mills and be progressive and re-adjust when necessary. The employer or employee is standing in the way of progress when he refuses to learn new and better methods, but he can hardly be blamed for objecting when it is clear he is going to be affected adversely by the new method. We are all afraid of things we do not understand, and some of these new methods are therefore naturally held in distrust—just because we don't understand.

OPTIMISTIC (MASS.)

The College Man in the Mill.

EDITOR COTTON:

It occurred to me that those who are writing and reading the discussion on the college man in the mill might be interested in reading the viewpoint of a Chinese, who was educated in a leading academic university in America, and who graduated as well from the Philadelphia Textile School, and who has returned to his native country to pursue the textile business.

It might be interesting to know that the first cotton mill in China was organized by British manufacturers, at Shanghai, over thirty years ago. At that time, very few Chinese had ever seen a machine, and yet they have now successfully learned the game, under the British superintendents, who are practical men, with theoretical college training, and an understanding of psychology. The workmen who have "graduated" from these mills are the best and most tractable in China. These cases prove that a foreigner, not possessing a knowledge of the country's language, can achieve success, if they have had a long experience in the mill, a college education, and a knowledge of human nature.

Then there are the college men in the Japanese-owned mills in China. Japan, by the way, owns nearly one million spindles in China, or about one-half of the total spindleage. Their success here is due partly, if not entirely, to the college man. Practically every important person in the mill is a college man. Every superintendent—called "engineer" over here—is a graduate of some kind of technical college, though not always a textile school. Every foreman or overseer in the departments is a graduate of some secondary technical school. In the Japanese-owned mills in China, most of the engineers are Japanese, while their assistants may be Chinese with a secondary college education. These men not only can talk, but they can and do direct the workmen. This also proves the value of the college man over here.

Now let's see how the college man gets along in the Chinese-owned mills. Lo! nobody home! With few exceptions, there is no place for the college man. Most of the managers are "self-made" men who simply hate to see a college man in their mills, much less employ them. They know perfectly well that they are inferior men, yet they insist upon employing inferior men around them. There are no words to explain how these men have affected the cotton mill industry in China—and yet they are still in power, more or less.

During the past few years, all of them have heard of the excellent results obtained by foreign-managed mills in Shanghai. Many of the old managers thought this result was due entirely to the practical knowledge of the men. Therefore, a few of the Chinese-owned mills have employed foreign "engineers"—and they expect them to take their ruined mills and convert them into 100 per cent-okeh propositions overnight.

Let's look into this matter carefully and see if we can solve this Chinese problem. These engineers are either Americans or Britishers who are invited to China directly from their respective countries, or who may have been in Shanghai already. Most of them, no doubt, are practical men, but they presumably lack education, which is a principal cause of their failure. They will give the workers a call down in front of everybody. This disrupts the cooperation of the managing force, thus shaking and destroying the morale of the workers. Some mills employ foreign superintendents as a sort of protection during the time of civil war and for other reasons. So far very few foreign superintendents have been able to get along well in Chinese mills for very long at a time.

Some may think that the foreigners can't get along in the Chinese mills simply because they are foreigners, but this is not so. If they are practical men, if they are educated, and if they know psychology, they are welcomed. The trouble is that very few of the foreigners here possess all three of these qualifications. When all conditions are equal, the Chinese workman usually pays more respect to foreigners than to superiors of his own nationality. The foreigner does not involve the party or personal difference; there is none of the "face" business. But there is only one American superintendent who has been getting along well in a Chinese-owned mill—he is not a college

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graduate, but he is well educated, knows human nature, and is a practical cotton mill man. We are always hoping that more of this kind of Americans will come to China.

Since the foreigners can't get along in the Chinese mills, one would naturally think that the Chinese who have been educated in American textile schools would be well fitted for the places. During the past few years scores of returned Chinese have come back from American schools with the idea and ambition of offering their services to the cotton mill industry. Their parents and their country expect them to do this. At the present time, a very few have stuck to the mill—the rest of them are in other lines of business. What is the cause of their failure? Why are the mills afraid to employ them? Why do they have to quit or be kicked out? They are college men all right. They are not foreigners, they presumably understand the nature of their race. What is it they lack? They lack practical experience, first of all, because immediately after returning home they have taken superintendents' positions with high pay, and do not start from the bottom to work up. They think they know what they are doing, but really they don't. Besides, they generally are young—from 25 to 35 years of age—and can't command the respect of the workmen. And they don't understand the psychology of running a mill—they are college men and they think they belong to the upper class while the workmen are of the lower class. They may even treat the managers in the same way, for these in most cases are not college men.

Human nature is the same the world over. Workmen expect their superiors to know more, and they want a square deal. The British and Japanese college men in the Shanghai mills are getting along because they have the necessary qualifications. The returned Chinese men and foreigners fail because they do not have them. Lacking one of these qualifications is just as bad as lacking all of them. If a man has them all, he is bound to win, even though he go to the heart of Africa. The three qualifications are experience, education and psychology.

A CHINESE.

Purification of Spent Fluids from Finishing Works.

EDITOR COTTON:

Sometimes the bleacher or dyer is required not alone to purify the water which he receives so as to render it fit for use but also to filter the waste liquors which he discharges, in order to escape litigation on the score of nuisance. A case of this kind that I have in mind was that of a friend who was having no end of trouble in getting rid of the spent waters from his dye and finishing works. The waters ran into a small river below his plant and badly polluted the stream, and the manager was notified by the powers-that-be that he must run the refuse some other way. The increasing attention that is being paid to the pollution of rivers probably will compel greater and more general care in this respect.

Having had successful experience in dealing with the refuse of dyeworks, I can say that where a plot of falling ground can be had below any works, the water can be emitted in a state perfectly free from nuisance. If the refuse of a bleach and dyeworks were allowed to flow continuously into a river as every machine or vat becomes spent, a great nuisance would be created. But if these various kinds of refuse are allowed to pass into a settling basin large enough to hold two or three days' store, the case is entirely altered. The various chemicals present react upon each other, and the impurities are thrown down in an insoluble form.

Now the articles likely to be in excess are spent, or nearly spent, dyestuffs and dyewoods from the dyeworks, and alkalis and acids from the bleachworks, and these are nearly sure to arrest the iron, tin, chrome, copper and lime, etc., emitted from both. The faint tinge of color resulting from these is afterwards easily got rid of by a passage through a filter-bed, with the addition of a little lime or other alterant. To meet the difficulty, the spent liquors from the works were at first collected in a settling basin having several compartments. When the first compartment was full the foul water passed through wire gauze at the surface into the second, and when this was also filled, into a third. In these sectional basins the various ingredients had an opportunity to react upon each other, and to undergo the influence of the atmosphere and to deposit their insoluble ingredients. From the last settling basin the water was allowed to enter filter-beds, and on issuing from them it reached a couple of dams near the river. In these it was clear, colorless, and devoid of smell and taste. Attested samples of the water were found by the soap test softer than the spring supplying the works. When submitted to careful examination the same water was found equal to the water found in the river above the dyeworks, and superior to the water which at another works in the district the most delicate aniline, cochineal, and safflower shades were being successfully dyed. Finally, a most important point, the firm occupying the works, being short of water from the dryness of the season, conveyed the water back from the last dam and re-used it with satisfactory results.

CONTRIBUTOR NO. 49.

Notes on Card Stripping.

EDITOR COTTON:

I have read with much interest the article by Wash (R. I.) in the May issue of COTTON on vacuum card stripping. As I have had one of these systems in for about two years, I think I have a right to speak on the subject. First, I think we save at least from seven to ten per cent production, especially where we strip three times a day. We begin by cutting the feed of cotton out of the cards, let it run a few moments and then put the vacuum hose on to begin its operation. Then we cut out the next one when we get this card stripped and move the vacuum stripper to the next card and cut the feed out of the next one, returning to the one just stripped and piece the end up on the coiler-head, and so on throughout the stripping process, and if I am not fooled, my cards stay sharper longer than by the old method, for the reason that in stripping with the roller, in putting up the roller if the cylinder is not stopped, the stripper hand will put his roll up against the cylinder before it stops. This means that the points of the teeth of the cylinder and the points of the stripper roll clothing will come in contact while revolving and thus causing "dubbed" points on both cylinder fillets. One is enough, especially on the cylinder, but this causes it on the stripper as well. It is next to an impossibility to get

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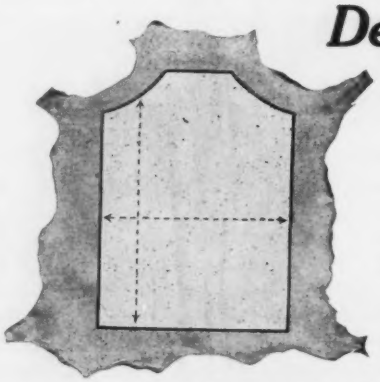

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the strippers to hold off until the cylinder stops, because they have a certain number of machines to look after, and they are going after it regardless of quality. Someone may say that you should make them do their work properly. That's all right to quote, but it's human nature to "get around with my job so that I can have some spare time," and they will do it more often than not?

With the vacuum stripper it is necessary to watch the vacuum and keep the pump cleaned out to get the best results. I run my vacuum on an average of twenty-two inches, and I do not have to clean out the pump more than four times a year. Of course care must be exercised as to the kind of oils used to secure the best results. Some oils will cause the pump to smoke and will not give the best results. I had this trouble but after a few experiments I found an oil that was satisfactory. The pump began to cool down and get to business and there was no more trouble.

Then with the vacuum system you have the dustless condition which makes it more acceptable for the operative, and less confusion, less labor turnover, which in turn means more production, cleaner machinery, and, if there are any bad cylinder fillets on the cards they will show up quicker. A man must guard against "hooked" points on the wire, for they will not strip out clean. It is a good policy to strip the cards good and clean by hand roller at the grinding period, which is about once a month. By so doing, there is one good hand roller stripping and burnishing once a month, and the vacuum stripper will take care of it the remainder of the time. T. A. D. (Ga.)

Saco-Lowell Horizontal Cleaner.

The high price of cotton in recent years has caused much study to be devoted to the problem of opening and cleaning the stock, and it has come to be realized that in this field there are many opportunities for real economy.

The work done in the opening room affects, to a very important degree, all subsequent operations in the mill. It is well to remember that a small amount of money spent in installing improved opening equipment may add greatly to the efficiency and earning capacity of a large investment in carding and spinning machinery.

The development of methods of handling the stock at this stage offers several possibilities. The quality of yarn made from any given grade of cotton can be improved by better opening and cleaning. The standard quality of yarn may often be maintained while using the cheaper and less desirable grades of cotton.

Still another result of better opening, and one of considerable importance, is that in the later processes of carding and spinning the work runs better and there is less waste and, therefore, a reduction in manufacturing costs.

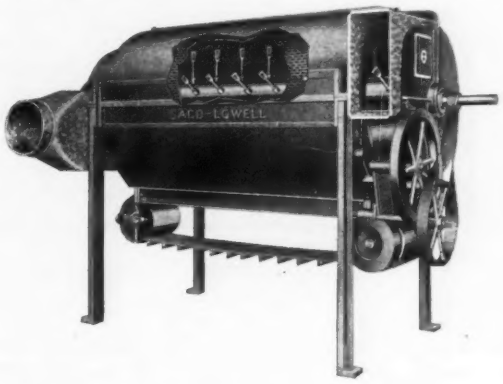
The Saco-Lowell Shops in a recent booklet describe in detail a new Horizontal Cleaner they have just placed on the market. When the vertical opener was brought out in 1915, the advantages of this type of a machine were so evident that it was soon in general use throughout the country, and today, the makers state, there are over 1,100 of their verticals in operation. Since that time the study of the problem and extensive experiments have continued, and one of the results is the Horizontal Cleaner. This new machine, it is claimed, has shown very satisfactory results when running for many months in mill operation, and can be used most successfully in connection with vertical openers, the horizontal and vertical cylinders each removing a somewhat different class of dirt.

Forming a part of the conveyor pipe between the vertical openers in the opening room and the condenser in the picking room, the cotton enters the Horizontal Cleaner through the inlet shown at the right of the machine in the accompanying illustration, and is drawn into the cleaner by the draft of air from the picker room. It is there acted upon by the specially designed beater revolving inside a cylindrical grid. This grid slowly revolves. The broken leaf that has been loosened up by the vertical openers is separated from the cotton without injury to the fibers, and forced through the grid to the outer chamber and dropped on the slowly moving apron clean-out, which continually removes the discarded waste from the machine.

The waste taken out in mill operations has been found to contain but a very small percentage of reclaimable material.

No additional labor is required when this machine is added to the opening room equipment.

The design and construction of the Horizontal Cleaner



show the care and experience that have helped to provide many features that will appeal to the practical mill man.

The design of the ends of the machine is such that the inlet and outlet can be adjusted to the varying requirements of installation in conveyor systems. This point, together with the fact that the cleaner may be mounted either on the ceiling or on the floor, makes it possible to place the machine in what might ordinarily be considered inaccessible positions.

With the exception of the clean-out apron and the spacers back of the grid, the construction is entirely of metal. The beater is mounted in ball bearings.

Up to 30,000 pounds per ten-hour day can be run through the Horizontal Cleaner, the makers advise.

The floor space—or ceiling space—required is 10 feet by 4 feet 4 inches.

"Power Equipment for Textile Mills" is the title of a new bulletin recently brought out by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis. This is known as Bulletin No. 143 and contains thirty-eight pages of typical installations illustrated and described. These illustrations not only cover small loom motor installations but also large water wheel generators operating in textile mills. It contains much material of interest for a mill man and may be had upon request.

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Bleaching.

EDITOR COTTON:

Will you please tell us, through "How Other Men Manage," the way in which others bleach goods that are intended for general use in dyeing and finishing?

W. H. A. (Tenn.)

EDITOR COTTON:

In answer to "W. H. A. (Tenn.)" I would say that the raw cotton in an unbleached state, or rather, the pieces made from the same, contain impurities natural to them of cotton wax, coloring matter, pectic matters, etc., and, added to them during the process of manufacturing and general handling of the goods, of starch, flour, fatty matter, dirt, etc., and that it is the object of bleaching to destroy all these impurities and render the product clean, i.e., to decolorize the coloring matters and to remove the other dirty substances. In carrying out this idea the operation of simple bleaching may be divided into two distinct parts: (1) the boiling of the material which is for the purpose of saponifying certain impurities that are partly then removed in the washing; and (2) the bleaching proper where the material is treated with the bleaching agent in which the coloring matters left in the goods are completely destroyed by oxidation.

By way of example we will take a kier full of the following goods: sateens, fine twills, brocades, and lawns and fancy woven goods, and for the quantities 300 pieces or about two tons. After the goods are stitched together end to end, they are usually singed well, on both sides, and wetted out. It is advisable to allow the goods to lie overnight in the pile either in one or two per cent of diastafor (which is best) or in caustic soda, or, in hot water alone. If in diastafor they must not go over 110 to 130 degrees F. Run them hot in the others and allow to cool in the pile.

First boil: They are now run through the washing machine (and cold water) into the kier where they are boiled from eight to ten hours with about 1,200 gallons of caustic soda lye standing about two degrees Tw. After boiling and handling carefully to avoid oxygen stains, the goods are drawn out as before through a washing machine and washed into the grey sour. Both high and low pressure kiers may be used.

It should be pointed out here that it is not good form to always use caustic soda for the boiling as it renders some classes of goods too soft when bleached. Sometimes boiling in an open kier with lime, followed by souring and washing and by an ash and rosin boil, etc., gives a proper feel to the goods.

First sour: It is usual to sour the goods in a souring tank in hydrochloric acid, but where no lime is used, sulphuric acid is just as good; the acid is cold and stands at two degrees Tw., and is sprayed over the goods for about two hours and then left. About 1,800 gallons of souring liquor are required.

Another method of souring consists of passing the goods through an ordinary washing machine into which the hydrochloric acid is allowed to run gradually while the goods are passing through. The souring is followed by twice washing after which the goods are passed back into the kier, by means of course of the washing machine for the second boil.

Second boil: The cloth is now boiled for eight hours

with 60 per cent of soda ash and 40 per cent of caustic soda or about 1½ per cent altogether. And then run through the washing machine.

Chemicking: From the washing machine the goods pass at once into the chemic cistern, which may be ordinary chloride of lime or hypochlorite of soda, in which they are treated as for souring, for two to five hours at one degree Tw. About 1,800 gallons of liquor are used for this purpose. They may also have a second sour after the second boil or before the chemicking but it is not always necessay, in my opinion.

Third (or Second) souring: As in the first and second sour, the goods are treated with hydrochloric or sulphuric acid and thoroughly washed, mangled, etc.

It is customary to leave the goods overnight in both sour and chemic. W. B. (Maine)

The Fly Frame.

EDITOR COTTON:

The fly frame is a subject in which, so far as I know, no new principles have been introduced for a considerable time, though many improvements have been made, such as improved types of differential motions, locking doors, new improved tapering and traverse motions, none of which have affected the machine in its principle—namely, a machine to prepare the sliver from the draw frame, and, by a series of such frames, prepare the cotton in the form of a roving bobbin, such bobbin to be so formed as to facilitate its use in the creel of the ring frame or mule.

The function of the fly frame is to further attenuate or draw out the slivers or rovings fed up, to impart sufficient twist to the thread, to maintain its uniformity of thickness during the strains of winding and unwinding, and to wind into the form of a bobbin so as to facilitate transmission and manipulation at the subsequent processes.

The frame may be roughly divided into three parts, the drawing, the twisting and the winding.

Taking first the drawing or draft, this is performed by the usual method, namely, a series of three pairs of rollers, each pair running at a greater surface speed than the preceding pair, thus performing two very useful operations at one and the same time, namely, making the roving finer and thus giving the opportunity of doubling which is so necessary to the production of an even yarn, and at the same time parallelizing the fibers.

As the ultimate strength of the yarn depends to a great extent on the number of fibers paralleled by drawing, the drawing is, if successfully performed, the greatest factor in producing strong yarn.

To successfully draw cotton no hard and fast rule can be laid down as to the diameters of the rollers, the distances that they should be set apart, or the amount of weights to be used on the rollers, for all these points are dependent upon each other. Also upon the length of the fiber, the amount of draft, the thickness or counts of the roving, or the amount of twist in the fed roving—these and many other points need to be considered in the setting out of drawing rollers on any cotton spinning machine.

In regard to the drafts in the rollers of frames, while it should always be desirable (when there is a sufficiency of machinery) to provide a bobbin as fine as possible for the counts to be spun, great care must be exercised to insure that the draft in any of the machines is not too great for the cotton being used, as the fibers once strained or broken in the drafting are the cause of unnecessarily weak and poor yarn. One point in regard to drafts must be always borne in mind—that drafts and speeds have often to be arranged not to suit our theoretical knowledge, but to suit the productions required with the machines at our disposal.

The fly frame is the first machine in the spinning mill to impart twist for practical purposes into the cotton, the object being to add strength, but only so much twist should be put in a roving as is necessary to allow it to be wound at the next process without stretching.

Any twist more than this is detrimental to the fibers, as well as being a waste of time and power.

The twist is imparted to the roving by means of a train of wheels, acting inside the frame end and driven from the frame shaft through a single carrier to the spindle shaft wheels and thence to the spindles. The twist wheel at the inside end of the frame shaft is really the rollers and cone drums driving wheel and thus determines the length of sliver delivered to a constant number of spindle revolutions, thus becoming known as the twist wheel, because it determines, not so much the twist per inch as the number of inches delivered to a given number of twists.

Another point which will affect the twist per inch is the relative weight of the spindle top and roller nip, while it is advisable to have spindles as short as possible to allow an easy entrance of the sliver into the flyer top, as well as for rigidity, etc. It is unwise in soft, short stapled cotton to allow the fibers to carry too far around the bottom roller before the roving receives its twist, as this allows a certain amount of stretching or drafting at this point; therefore increasing the total draft.

Then again, it will be noticed that when the spindles are very low from the roller and the angle of the roving is very acute, also when the atmospheric conditions are unfavorable, the frames run badly, making both bad work and much waste. The atmospheric electricity causing the fibers, which have carried a long way around the bottom roller before receiving any twist, to be repelled from the roller and disassociated, the result being split and erratic roving. On the other hand, if the spindles are too long and the roving hangs on the flyer at a too horizontal position we do not get the full value of the spindle revolutions at a point between the flyer and the roller.

Winding is performed by either revolving the bobbin at a rate of speed equal in surface speed to the surface speed of the front roller in excess of the spindle revolutions as in a bobbin leading frame or equally slower as in a spindle leading frame.

The actual revolving of the bobbins being chiefly performed by the fixed bevel wheel on the frame shaft, as in Houldworth's motion or by the cross shaft as in Howard & Bullough's differential motions, and not, as is often supposed, by the cone drums and their attendant motions, these only imparting such revolutions in a bobbin-leading frame as to equal the surface speed of the roller. For instance, a frame with a spindle speed of 1,250 revolutions per minute and a front roll speed of 115 revolutions per minute would, if the diameter of the empty bobbin and the roller were equal, only receive from the cone drums 115 revolutions, whereas from the fixed part it would receive 1,250 revolutions; so that while the cone drums only

perform part of the winding, they perform that part which is most vital, the part of evenly regulating the tension of the roving, and to do this the cones are designed on the principle of the parabolic curve, this curve being adjusted into a pair of concave and convex cones so as to allow the belt to be always maintained at one tension and to allow proportional adjustments to the increasing diameter of the bobbin, and it is at this point in the regulating of the proportional adjustments that the troubles of a frame come in.

The usual method of adjustment is by the rack wheel, and this gives good results if set to the best advantage, that is, the catches well set to give an equal amount of alteration at each change and with the correct wheel on. The reversing catches are the principal part in making the rail changes and at one and the same time they change the direction of the motion of the rail by reversing the bevels on the strike shaft and re-adjust the winding by moving the cone drum belt and by shortening the fulcrum of the tapering bar which forms the end cones of the bobbins.

The principal points in a good flyer are the balance, the finish and that the presser shall be of the correct weight for the roving being made; a presser too heavy for the roving will often strain the roving when the frame is being started and stopped and many rovings broken.

J. L. (MASS.)

"Wash" Offers Some Advice.

EDITOR COTTON:

There is no question in my mind but that a number of practical mill men will be caught in the swirl of the four lines of drawing rolls on the fly frame, spinning frame, and mule. However, those who are at work with the experiment should hold firmly in mind the benefit of doublings.

As a warning, let me picture what I really believe will be the lay-out when this principle is adopted and made successful: (1) The number of cards will be doubled, or each card will be equipped with two coilers, as found on cards running waste; (2) the card will not turn off an excessive production, on the average work not to exceed 700 pounds per week of 48 hours; (3) the drawing sliver guides will be arranged to carry 12 ends instead of 6; and (4) the stock must be uniform in length.

With such a lay-out, the cost would remain the same, but the doublings would be doubled, which would help to destroy the defective places in the strand that exist in every card sliver.

The four lines of drawing rolls are going to be adopted, but every mill man should watch the columns of this department, for there is a mill in England drawing 42 inches with the four lines of drawing rolls, and making an almost perfect yarn, so I am told. But there are plates used to help this long draft, in connection with the drawing rolls. As soon as I get the information I now am seeking, I will pass it along to the readers of COTTON through "How Other Men Manage."

In the meantime, let's go slow, and not discard the intermediate, fine or jack frames until we have described this device.

WASH (R. I.)

Human Relationships in Industry.

(*Continued from page* 32.)

objective requires that a study shall be made of the cost.

III. Possible costs of defects and misinterpretations of orders:

1. Decrease in production.
2. Increase of seconds and waste.
3. Accidents.
4. Faulty execution.
5. Friction between overseer and operatives.
6. Friction between operatives.
7. Disregard for orders.
8. Bad name for department.
9. Labor turnover.
10. Loss of good operatives.

As has been suggested in other discussions, the group can add to this list as many other costs as they feel legitimately belong here. If there are defects and misinterpretations of orders, and these defects and misinterpretations are costly, the next step would naturally be to seek for remedies to apply to try to effect a cure. In the suggestive remedies that are indicated in the following outline, you will notice that remedy 1, corresponds to defect 1, remedy 2 corresponds to defect 2, in Section One of this conference.

IV. Suggested remedies for defects and misinterpretations of orders:

1. Take time to consider.
2. a. Concentration.
   b. Written orders.
   c. Call attention to consequences.
   d. Back check.
   e. Definiteness and positiveness.
3. Word order concisely.
4. Be sure to cover all components.
5. Make orders definite and in terms that an employee will understand.
6. Use care to whom orders are given.
7. a. Deliver direct.
   b. Write indirect orders.
8. Write order.
9. Deliver at time order is to be executed, or study the time element in giving orders.
10. a. Issue no unnecessary orders.
    b. Plan to reduce seemingly necessary orders.
11. Give orders in the sequence in which they are to be performed.
12. Self control, and then strive to get control of the sane mind of the one to whom the order is to be given.
13. Be sure to have the facts.
14. a. Systematize the giving of orders.
    b. Written orders.
15. a. Written orders.
    b. Require one to whom order is given to make a record.
    c. Impress importance.

These remedies are only suggestive and are not intended to be declared effective cures under all conditions. The group that the conference leader has may be able to suggest further remedies and more effective ones. In conducting this conference, please do not conduct it like a school teacher, "hearing a geography" lesson. With her, the

Do you know that ordinary spools are costing you thousands of dollars?

Replacing short lived, quick to-break-and-splinter spools with the same type is like pounding sand down a rat hole. Results are the same—a mere waste of time and money.

Lestershire *Vulcanized* Fibre Spools

You think your spooling room cannot create a profit. True enough, for the purpose of spooling and warping is merely to put the yarn in more convenient shape for weaving. But the use of ordinary spools does not result in a tremendous waste of money. Through prevention of wastes Lestershire *Vulcanized* Fibre Spools save this money. It is a profit in every sense of the word. Here is how it is done

The heads of ordinary spools break, splinter and come off very easily while Lestershire Spool heads are practically indestructible. This means many dollars saved which would otherwise go into spool replacements. In many mills the yarn thrown away with defective spools amounts to thousands of dollars. This tremendous yarn loss is prevented by Lestershire Spools.

On the productive side there is a 10% increase in yardage on Lestershire Spools. The increase in your warping or beaming operations is from 20% to 10%. Spooler kinks and knots due to spools are eliminated through the use of these superior spools. The quality of your warps is increased together with an increase in quality and production in your weave room.

Wages in your mill are at a level where economies are welcome. Lestershire Spools save wages in your warping and weaving departments—and materially reduce operating expenses of these departments.

Doesn't this arouse your curiosity as to what Lestershire *Vulcanized* Fibre Spools will do for *you?*

Unconditional Guarantee

Lestershire Vulcanized Fibre Spools are guaranteed unconditionally.

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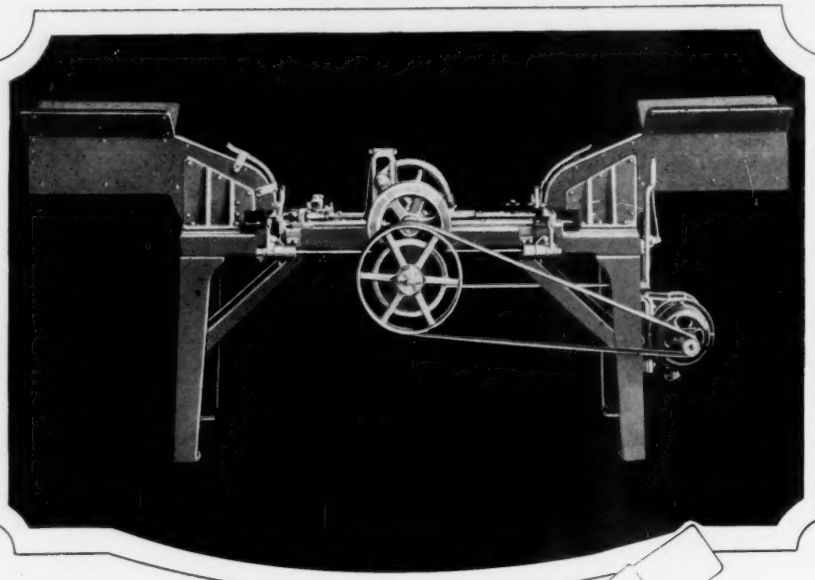
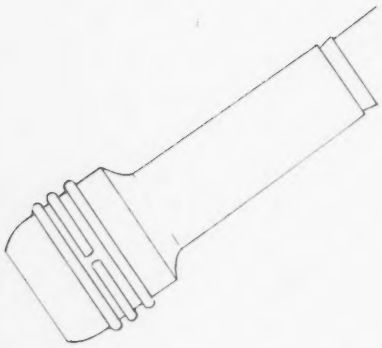


Greatly Reduces Quill Cleaning Costs



Your own mill should be able to obtain the same results with the Utsman Quill Cleaning machine that hundreds of other mills have obtained during the past six years. These other mills have reduced not only the cost of cleaning, but have radically reduced the cost of quills.

The double end Utsman, illustrated above, cleans approximately 80,000 bobbins per day; cleans each without split ends that catch thread and delay production, and in no way shortens the life of or injures the quill.

Let our Engineering department give you the facts and figures regarding what an Utsman will save for your mill. Just write us, "Send the Utsman facts."

The UTSMAN

FEELER BOBBIN CLEANER

The TERRELL MACHINE COMPANY, *Inc.* CHARLOTTE, N.C.

answer is wrong, if the student does not answer according to the book. In this work the reasoning mind of man is, and must be, respected.

Some one may feel that the suggestions contained in this conference are theoretical and of little value. They were developed largely by overseers in cotton mills. Again, the objector should pause in his objections and consider the fact that it is the little things of life that make or mar it. It is the seemingly insignificant thing that insinuates itself into our physical body and gradually undermines our health until a prolonged illness attacks us before we are aware of it. It is the little things of industrial life that creep into it and unconsciously to the managers, in a cancerous way, eat out the vitals of the organization.

This detailed study may be termed a microscopic study for the death dealing germs of this particular phase of industrial management.

Most of our boys who were soldiers in the late war were deeply grieved in spirit and suffered many heart-throbs of pain and anguish because of the attitude of their commanding officer in his habitual manner of giving orders. Revulsions, mental reactions of all kinds took place in the quiet of their few meditative minutes. War is an expediency and drastic in its action, and this may explain the harsh and imperial commands of the officers in the execution of their duty. It may also be an indication of a once insignificant man drunk with his new authority.

There are men in executive positions in industry that seem to have taken some of these "hard boiled" army officers as their ideals in their giving of orders. The fifth and last objective of this conference is indicated in this analysis.

V. Manner of giving orders:

1. By command.
   a. When previous orders have not been carried out.
   b. In emergencies, when life or property is in danger.
   c. For discipline.
   d. As a last resort, avoiding argument.
   e. When necessary to impress importance of order.
   f. When order will not otherwise be carreid out.
   g. Order should be dignified and in keeping with its necessity.
2. When orders should contain directions.
   a. Lack of information on the part of the recipient as to conditions to be met or the method of execution.
   b. Inexperienced man.
   c. When the executive is not sure that the man understands how to execute the order.
   d. When the man lacks initiative.
   e. When order is to be executed in a manner different from the ordinary way.
3. When orders should be in the form of suggestions.
   a. When cooperation is good.
   b. When cooperation is not good and such a method will produce cooperation.
   c. When dealing with outside matters.
   d. When dealing with experienced men.
   e. When man is to use his own judgment.
   f. Whenever possible.

People are great followers and can be lead to do almost anything reasonable and many things unreasonable. The great body politic does not like to be driven, they do not like to be commanded any more than necessity demands. If an overseer has a group that he can not lead, but must stay behind them and drive them, I am of the opinion that he is weak in his administrative ability somewhere. Orders are the whip of the driver, if he so desires them to be, or they can be but the natural and wholesome directing force of a happy, harmonious, thrifty, efficient group of people. If you have carefully followed this through, I am sure that the group has at least one new idea or resolution, or it has within the mind of each one, set up a line of thinking that sooner or later will result in this. For this reason, I know this discussion has been of value. One new idea in one mind is a good reward for this discussion.

Apportioning Work.

EDITOR COTTON:

Sometimes I am too hasty, and then again I think I am a drone and everybody is getting ahead of me; sometimes I think my thinking faculties are deteriorating. Then I brush up, hustle around and work myself tired and try to make myself believe that I am still on the map.

But what I was going to talk about was the question that "I. K. (Mass.)" asked in a recent issue of COTTON with reference to the amount of work per operative in the carding room. I wanted to wait and see what others had to say before I put in my opinion. Here is my method?

There is now one operative per 21 cards, the doffer making 12 turns per minute, the slivers weighing 55 grains per yard. The card tender does his own getting and lapping, cleaning, attending to the backs and fronts. Card strippers oil and strip and clean everything overhead. Card tenders sweep floors around cards, which is done four times a day.

The drawing frame hands tend to 24 deliveries, do all the cleaning except the top and bottom rolls when they are taken out and cleaned and the stands greased and oiled, which is done every two weeks. Drawing tenders sweep floors around drawing, which is done four times a day. The drawing slivers weigh 60 grains per yard.

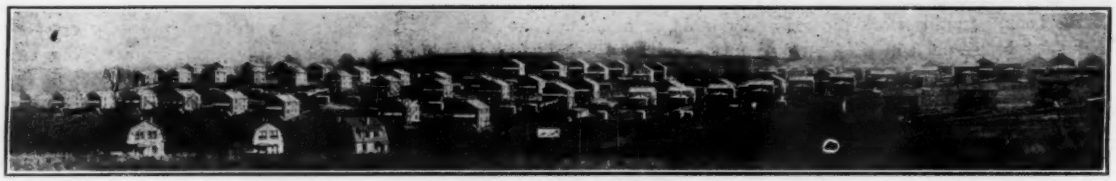
At the slubbers, one tender takes care of three frames of 64 spindles each. They do all this work except the oiling and sweeping. We make a .56-hank roving here. No spare help at this process.

On the other roving frames, one tender has three frames of 112 spindles each, and do all the work except the oiling and sweeping, making a 1.90-hank roving. We use one spare hand to eight frames here.

In the spinning room, one operative has eight to ten sides of 112 spindles each, and does all the cleaning and setting in of the roving but no oiling, sweeping, doffing, etc.

When the sliver from the card is lighter, such as 50 grains, the intermediates on roving will run about the same, that is, one worker for three intermediates of 112 spindles; one to four frames of jacks with 160 spindles each, and eight to twelve sides of 112 spindles in the spinning room, cleaning as on a 55-grain sliver.

This may look like it's overloading, but there is some work that might be picked up that could not be depended on regularly, but you can in a pinch. We use no spare hands in the spinning, and one spare hand to 10 frames on the jacks or roving frames. T. A. D. (GA.)



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Will you write for full description?

G TRADE MARK

GARLAND MFG. CO.
SACO, MAINE

Towels and Toweling.

BY T. WOODHOUSE AND A. BRAND.

(*Continued from page* 30.)

the blank squares are developed with plan L which gives the filling float effect. The key-plan N on 8 by 8 squares is thus developed to (8 × 5) by (8 × 5) squares on 40 threads and 40 picks as shown by the unit in G, Fig. 76.

A distinctive and characteristic diamond weave fabric is reproduced in Fig. 77. It is woven with 2-fold cotton warp and single linen filling in approximately the same setts and counts of yarn as the fabric in Fig. 75. Four repeats of the weave are given in Fig. 78, where it will be seen that the foundation lines of the diamond shaped spaces are formed by right-hand and left-hand twills with floats of three. The spaces themselves are filled in with distinctive weave effects. The unbroken diamond in the first unit—that developed in solid black squares—is filled in with the 8-thread honeycomb weave, while the four corners, which constitute the alternate diamond shaped space, are developed in the 6-thread imitation gauze weave.

Properly speaking, neither of the weaves used in Fig. 78 is correctly described as a huckaback but both of them are analogous to, and may be regarded as belonging to the same family, as the ordinary huckaback; particularly is this the case with the imitation gauze, or mock leno weave as it is sometimes called. Indeed, the huckaback class is sometimes regarded as a natural development of the imitation gauze weave, but it is just as possible that the de-

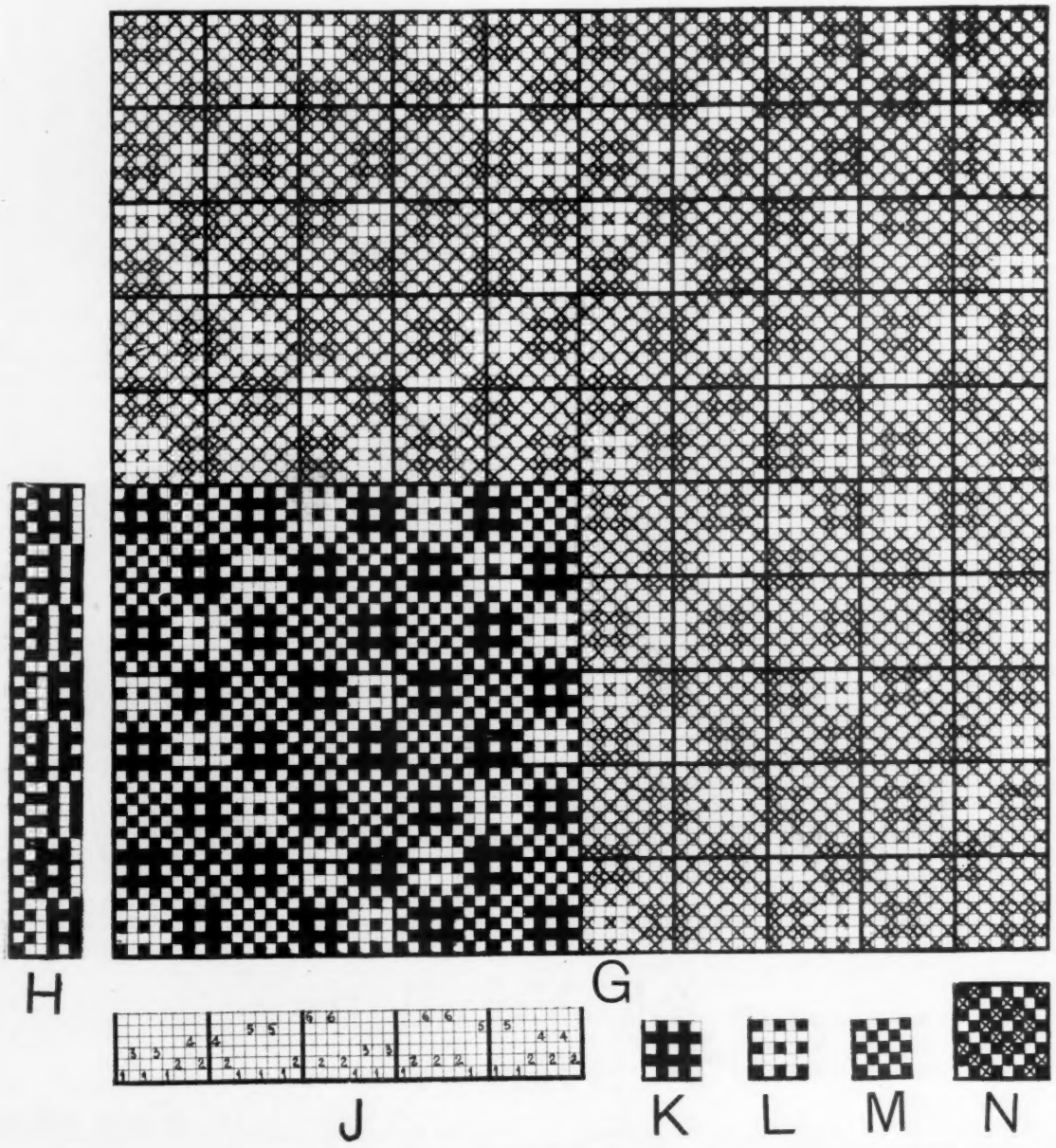

FIG. 76.

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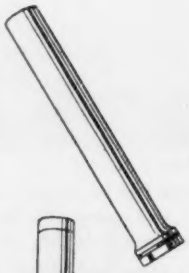

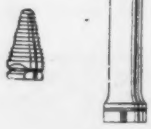

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velopment—if there is any relation of this character—occurred in the opposite direction, i.e., that the imitation gauze weave was originally developed from existing huckaback designs.

The unit weave as shown in black squares in Fig. 78 requires 19 harnesses, and if the 18th thread is placed on the 1st harness, the draft would be a pointed one, while the weaving plan would be the last 19 threads of the first unit, i.e., threads 18 to 36 inclusive. This would place the central thread of the honeycomb design next to the selvage

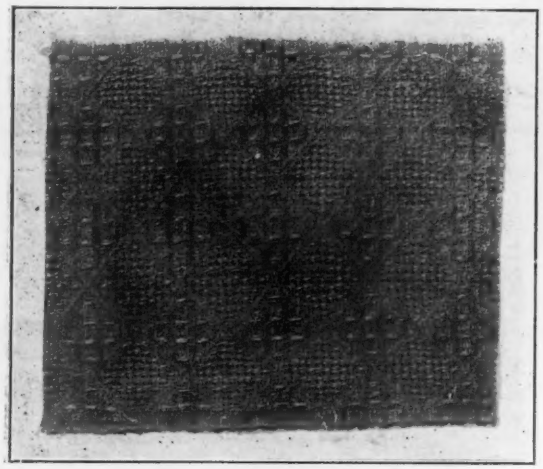

FIG. 77.

threads. Another way would be to use the pointed draft, and then employ threads 36 to 54 inclusive of design in Fig. 78 for the weaving plan. The latter arrangement would give a firmer bit of cloth near the selvages proper.

A modification of the design in Fig. 78 is introduced in Fig. 79. The surface of the resulting fabric would be flatter than that illustrated in Fig. 77 and produced by the design in Fig. 78. This change would be due to the introduction of the plain weave in the alternate small diamond sections of the original honeycomb weave. The same draft, pointed, on 19 harnesses, could be used provided

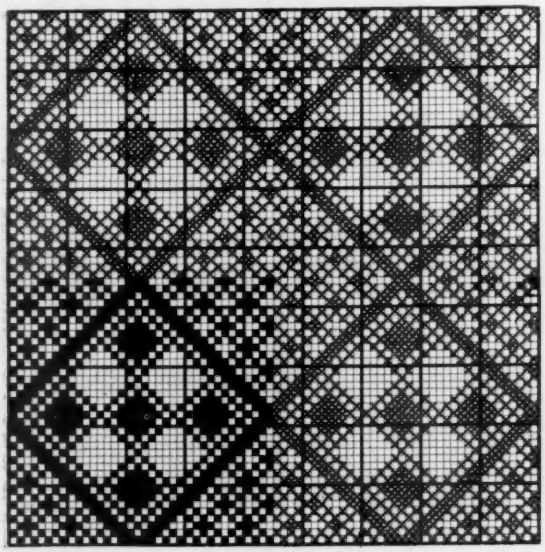

FIG. 78.

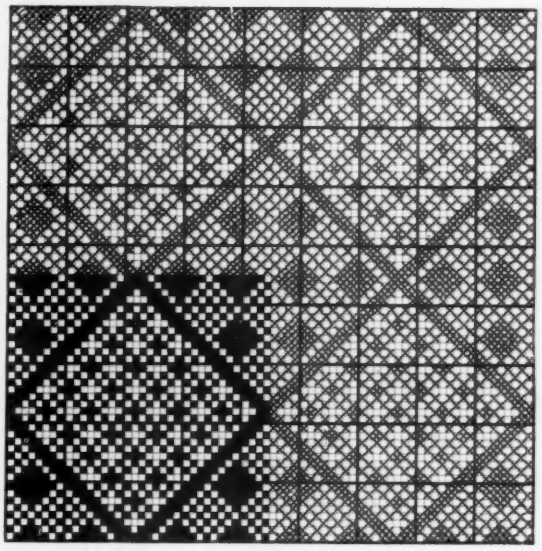

FIG. 79.

that the weaving plan was made from threads 36 to 54 in Fig. 77. In order to obtain the most characteristic effect in the imitation gauze sections, the reeding should be arranged three threads per split, and the 3 up 3 down floating thread should be the middle thread in the split. This remark refers to both designs in Figs. 78 and 79.

(*To be continued.*)

Mill Men Meet at Louisville.

(*Continued from page* 23.)

Resolutions adopted by the association, following long discussion, were as follows:

Resolved: That the Howell-Barkley Bill be opposed by this Association on the following principal grounds:

First, It would repeal title 3 of the Transportation Act of 1920, from section 300 to 316 inclusive, establishing the Railroad Labor Board. In our judgment this Board has not yet had an opportunity to vindicate the confidence that was placed in it by those who favored its creation. In any event the Transportation Act of 1920 provides for a better procedure for adjustment of disputes between employers and employees than under the Howell-Barkley Bill.

Second. The general public is excluded from participation in all preliminary adjustment of difficulties between carriers and employees, although the public interest at stake is the only justification for a Federal statute relating to the subject.

Third. The measure provides a very complex and expensive machinery to compel by legislation national agreements as distinguished from agreements between the management and the employees of each road.

Fourth, Membership of all adjustment bureaus on the employees' side is confined to the membership of Railroad Unions. This is in effect a compulsory adoption of the Closed Shop by all American railroads by an Act of Congress, and it would force unwilling citizens into railroad labor organzations under pain of deprivation of all representation with reference to their contracts with their employers.

Fifth. We urge upon the members of Congress from our respective states their opposition to this measure, which will be introduced in the next session of the present Congress.

The Middle States Textile Manufacturers Association regards with regret and alarm the marked tendency in radical proposals affecting the constitutional form of Government of the United States towards breaking down and indeed removing the many safeguards which have made for the safety of our Federal Government. It deplores as a grave menace the insidious and disguised, and at times overt attacks upon

KNOXALL

ALL WOOL
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Makes better yarn, less waste and saves in leather more than the extra cost.

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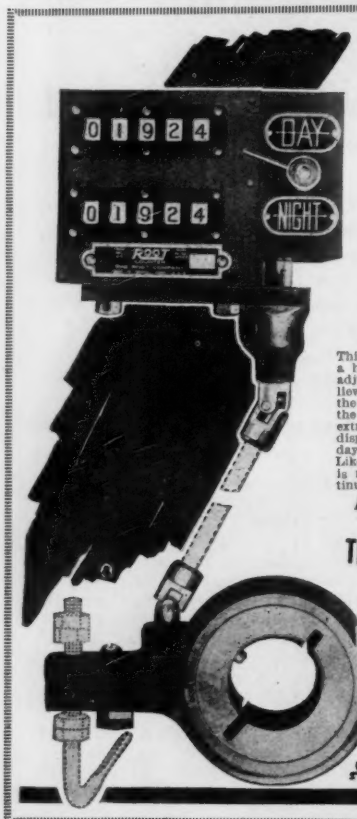

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PICK COUNTER

This new development has taken like a hot cake in the textile field. The adjustment of the lever by the relieving operator automatically records the picks of his labor on his side of the counter, it saves the cost of an extra counter and also eliminates any dispute between the operators of the day and night shifts.
Like the single Root Pick Counter it is made to stand vibration and continual operations.

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Thousands of dollars are saved annually at small initial cost by owners of Elwell-Parker Electric Industrial Trucks, Tractors and Cranes. They pay for themselves.

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SEVERAL NEW FEATURES

have been added to the "1913" cloth Cutting, Folding and Winding Machine which add at least 50 per cent to its value to YOU.

It will cut your cloth—fold the edges—roll it up and give you an exact measurement of every piece of cloth going through the machine.

It saves time, labor, machines and cloth.

YOU ONLY NEED ONE MACHINE where before it required two and you get an extra strip from each bolt of cloth.

It cuts the corners of expenses in every way and leads to more and greater profits.

THE ENORMOUS SAVING WILL INTEREST YOU.

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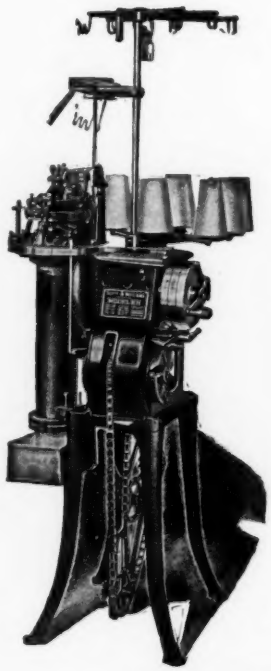
NEW MODEL H-H

Producing Ribbed Top Half Hose Complete



Ribbed top made on two sets of needles.

Automatic transfer from ribbed stitch to plain

Eliminating necessity of skilled help.

Saving of raveling waste which occurs when topped by hand

Each stocking is dropped from the machine when finished.

Each stocking is automatically started upon the empty needles, producing a French welt without drawing thread or cutting, no ends of any kind to be removed.

Machine is fitted with five yarn fingers.

Provision is made for high spliced heel and double sole

Provision is made for ring top and ring toe.

Needles without rivets or latches.

Speed of machine about the same as Model K.

Production about twelve stockings per hour on 3¾" 220 needles.

One operator can take care of the same number of machines as Model K.

The machine is built in all gauges.

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Has Trouble With Latches Bending.

EDITOR COTTON:

I am operating a small mill, using plain Banner machines bought new about eighteen months ago. We have these machines on children's work, fine gauge, 172 needles to a 3¼-inch machine. I am having trouble with them bending the latches on the needles that are raised when the guide flies up. I have tried setting the guide a little farther away from the needles, but it seems as if I can set it so far away that it gives trouble in some other way—and it will still bend the latches.

Some time ago it seemed that all this trouble had vanished. At that time we were running some unusually good mercerized yarn. (We run mercerized yarn altogether.) But now we have some yarn that seems a little stiff, and I am having more of the trouble mentioned.

If any reader of "Knitting Kinks" can suggest anything that I may do to remedy this, even with the stiff yarn, I shall appreciate it. F. G. (TENN.)

Checking Up on Underwear Defects.

EDITOR COTTON:

It seems to me that "H. G. (Tenn.)," an underwear manufacturer, has struck something of pertinent interest in the questions he asked in the "Knitting Kinks" section of the September issue of your magazine.

His first question was with reference to methods for checking up on needle lines and other bad work in the knitted fabric. In response to this I will say that we have no special method for checking imperfections, needle lines, etc., in our kitting. We do have, however, a party whose business it is to continually inspect the material from machine to machine for such imperfections. While we have rarely been obliged to charge up loss of cloth to the knitters on account of such imperfections, it is understood that we would do so if it was necessary.

Candidly we have tried almost all of the different special methods of checking these troubles, and have at last come to the conclusion that "the time to shut the stable door is before the horse is stolen," so that such effort as we put in that direction is merely in the line of inspection while the work is being done, not after the loss has been sustained.

I should be very glad to see further letters from "H. G." and other underwear manufacturers. It will do us good to gain the other man's viewpoint and learn of his practices through the discussion department you are conducting.

M. S. (MASS.)

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promtly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

EDITOR COTTON:

It is very good, I think, that you have begun in COTTON a discussion section where we knitting mill fellows can talk to one another, informally, across the continent, as it were. Here I find myself, up here in the Mohawk Valley, answering the questions of a knitter down in Tennessee, who signs himself "H. G.," and who wants to know about checking up on defects in underwear knitting, etc.

I recommend to him, and other underwear men, the use of special men in the knitting department whose job it is to inspect the machines periodically. We use this system at our mill, where we make, among other things, union suits for men and boys, and these men inspect the machines four times a day to watch all the needle lines or bad needles in the machines. In addition to this, the operators themselves are instructed to watch this very closely.

We are not penalizing anyone for bad work as we have never found it necessary, since we get so little of it with this system.

And now in closing may I suggest to "H. G." that he tell us his system for doing these things, in other words, that he answer the question from his own mill's practice?

B. M. (N. Y.)

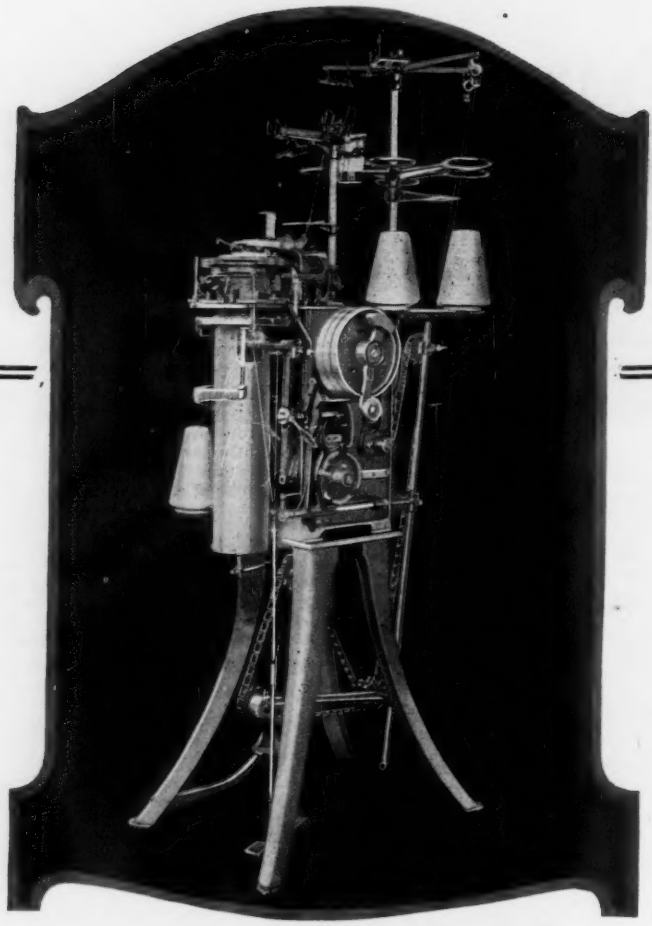
EDITOR COTTON:

Answering "H. G." (Tenn.)"—

Local conditions at each plant of course determine to a large extent what can be done. For example, he intimates that he makes deductions from operator's wages for defects found in the cloth. Now, I don't believe we could do this, because if we charged the operator when needle lines or other bad work appeared in the cloth, they would all quit.

I will say in answer to one of his other questions, however, that we inspect all our cloth after it is knit.

While, as I say, we can't all adopt the same plans, still it is very interesting to read of the other man's ideas and his reasons for holding them, and I hope we can have some



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sure-enough discussion on underwear manufacture. I am sure many of your readers will be willing to answer any further questions from "H. G." or others pertaining to the knitting of underwear. B. L. (N. Y.)

EDITOR COTTON:

Our mill operates yarn and cloth weaving, as well as underwear knitting, and, in replying to "H. G. (Tenn.)," I will say that the underwear department is small in comparison with the other departments and that we cannot claim to run it on any scientific basis and have no special system for checking up on imperfections in the underwear.

I will say, however, that for any defects in the fabric due to the knitting, we deduct from the knitters' pay—and that is about the only deduction we make for bad work.

I would give more information on this if we were equipped to do so. I am sure, however, that some of the larger and more scientifically organized plants have more definite systems for doing this and we all would be glad, I know, to hear, through the "Knitting Kinks" discussion section, how some of them do it. I trust that some of them will send in answers to the questions asked so we may have published in later issues of COTTON their opinions and get the benefit of their experiences. M. L. (MASS.)

EDITOR COTTON:

While our production of men's union suits is comparatively small and we do not have any elaborate or special system for checking up needle lines, I still believe we save money by keeping right up with them. We have our knitting operators inspect the cloth on the knitting machines almost continuously, every ten or fifteen minutes, and they catch most of this at the knitting machines.

We do run with what we believe is a very low percentage of seconds, as we will run on the average with 8 per cent seconds—and we cut all of our damaged fabric into seconds. We do not have any system of deducting for defects from the wages of the operators. Our plant is a small one and everyone is constantly watching to eliminate the defects.

However, I shall read with interest what other men are doing in this direction. S. Y. (OHIO)

EDITOR COTTON:

I think we underwear manufacturers ought to keep right in behind our bad work, and keep a check on everything that shows the least possible chance of making a defect. For that reason I was especially glad to see the questions asked by "H. G." in your September issue. I hope these will bring out the opinions of other underwear men.

As for ourselves, I will say that we have a system of inspecting as the machine is running. This is done by the foreman. We also inspect the goods in the cutting room. We class anything imperfect as a defect. When we find an excessive number of defects, the only thing we can do is to call the operator's attention to it and urge more care in the future, because we pay our workers by the day, instead of by piece-work, and hence cannot make deductions for bad work, as is suggested by "H. G."

M. D. (CONN.)

EDITOR COTTON:

We possibly have a system of inspection, etc., that is different from most mills, and for that reason I am sending you an answer to the questions propounded by "H. G." in a recent issue of COTTON, asking underwear mills to describe the method used for checking up on defects, to tell what is classed as a defect, and how deductions for these are made from operator's wage.

All of our fabric, after being taken from a machine, is inspected by drawing it over a roller, and needle lines or other bad work is noted on a tag which accompanies the work.

As a matter of fact, everything is classed as a defect that prevents 100 per cent cutting from the roll, but nothing is laid against the knitter except those things due to carelessness or lack of watchfulness. The general rule is to fine a knitter by the yard for all needle runs above a small minimum. The amount deducted, as well as the minimum run, all depends on the grade of fabric being knit and on the cut of the machine and the quality of the yarn. On an average fabric, made, say from 26s/1 carded yarn, and run on 12-cut machines, a good rule is to allow a five-yard minimum for knitting runs and bad needle marks. For all yardage above the five-yard minimum reported by the inspector, it is fair to fine a knitter about five cents a yard. On finer counts of yarn, finer cut work and extra good quality of yarn, the fine should be heavier for the rate of pay is higher, and greater watchfulness should be exercised.

CONTRIBUTOR NO. 3605.

EDITOR COTTON:

I hope that a free and open discussion of underwear mill problems will result from the questions asked by "H. G." in the September issue of "Knitting Kinks." I shall be glad to answer any questions relating to the mill that I can answer, in the thought that we will all profit by swapping ideas.

With reference to "H. G.s" questions, I will say that we have an inspection of the fabric on the machine by the second hand and the foreman; also an inspection is given every yard of cloth after knitting. In this way we hold the defects at the source.

As to what are classed as defects, we include holes, bad latch marks and needle cuts.

With reference to deducting for defects from the operator's wages, at the discretion of the foreman the operator is charged with a certain number of garments and the per cent rate for these garments is deducted. We leave this matter up to the judgment of the foreman.

I hope these opinions will be of interest, and shall be glad to read the thoughts of others on these points.

CONTRIBUTOR NO. 3606.

EDITOR COTTON:

In response to "H. G.'s" questions in the September issue about underwear defects, will say that each of our knitting machines is numbered, in rotation. The cloth from each machine is marked by the operator tending the machine, who indicates the size, style, and number of machine upon which the cloth is made.

The cloth is inspected by the cutters as they lay out their work for cutting, turning or cutting out the defects to make the least possible waste of cloth.

If the cloth from any particular machine has an unusual number of defects, it is reported by the cutter to his foreman, who reports in turn to the foreman of knitting. The

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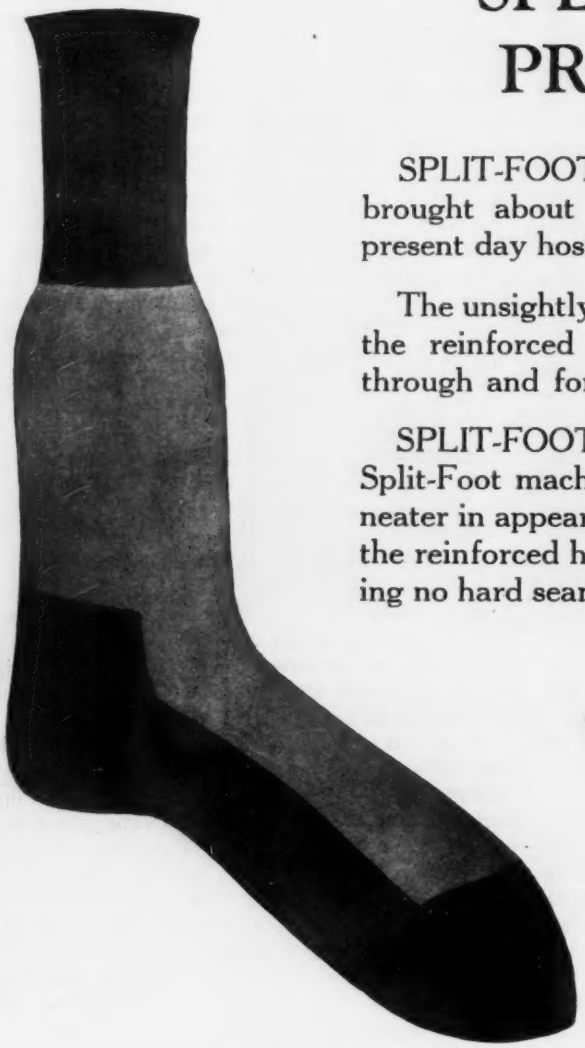

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knitting foreman immediately inspects the machine bearing the number shown by the goods, and remedies the cause.

What is a defect, asks "H. G." A defect is any imperfection that would prevent a garment from being classed as "firsts."

The foreman of each department is held responsible for any bad work made by the help under his charge. If he finds an operator who continues to be careless after one or two warnings, he discharges the offender.

I do not believe that a deduction from operator's wages, for any cause at all, is good. It is apt to create an ill feeing and cause more or less trouble among the help, and should be avoided if possible. F. F. (N. Y.)

EDITOR COTTON:

In reply to the various questions of "H. G. (Tenn.)" in the September number of COTTON, I will give you the system I use in our mill relative to the faults and corrections as well as check-ups.

First, a complete record is kept of each case of yarn, carefully noting the gross, tare and net weights of yarn, which all in turn is again weighed and compared with the original cases. In this manner the actual loss or gain is determined in the first stage of manufacturing textiles. My records show a greater loss than allowed by the two per cent for cone allowance. I, therefore, in every instance deduct a greater loss from the invoice or add the excess weight when paying invoice. In this manner it is fair and honorable to both spinner and manufacturer.

The yarn is then knitted up. Likewise a strict record of each machine is kept with the machine number or size or letter whichever is most suitable and requiring the least work. This is recorded in a book large enough to show the production of that machine, the daily or weekly amount knit. The amount is again recorded upon the removal from the bleach or dye house.

In this manner I can accurately determine whether the cutter, who is only allowed to cut firsts, used up 1, 2 or 3 rolls that were knit badly, had drop stitches or other knitting imperfections in his cutting. Records will immediately tell and will locate the very machine, where knit and by whom. Since these cutting records are handed in daily, at a glance the amount of imperfection in pounds can be determined. Then, assuming that it is a forty dozen case, and our records show that this style uses seven pounds of stock to the dozen; it would require 280 pounds. If the cutter's record shows more than a 13 per cent waste (which I find is logical and about correct for a cutting room on our various styles), or, if this particular record showed 350 pounds used, when the 13 per cent added to 280 pounds shows 316 pounds should be used, it plainly shows that 34 pounds more were used than should have been and some one was at fault either in the dye or bleach or knitting room.

Since the cutting room foreman makes his report as stated, and his attention is immediately called to this bad work, he at once notes on this cutting order the nature of this bad work. If it is in the knitting room, a charge is made against the individual knitter in the difference or actual waste that cannot be used. In many instances this actual loss will shrink to five or six pounds, because sleeves, gussets or various other firsts can be cut out of it. Should this be the case, we would then charge either the five or six pounds loss multiplied by the actual cost of the yarn plus production in pounds and the loss in dyeing or bleaching.

At the end of each month the yarn consumed is totaled, the yarn on the machines and opened, is weighed and checked against the knit record showing the loss in knitting, and the loss in dyeing and bleaching we can take from our records. In this manner the losses in the three stages of manufacturing are determined.

Upon the return, since each roll of cloth is numbered with a laundry tag as to size, and numbered consecutively, not as to a whole, but individually as to machine, viz. Let us assume a 14-inch machine is in operation. We start in at No. 1 and go up individually, and so with each machine. This is done to expedite the system to follow in the cutting room. Before the cutter takes or uses the roll, he takes a record of the number of that roll. If only partly used he weighs the roll, putting a tag on with the weight for future use when occasion requires him to take the same roll. In his mill order he then totals the amount of actual cloth used and the individual number of the rolls. In this manner he can tell exactly how much stock was used for each order and the waste.

Remember in the bleaching or dyeing we do not include knitting charge or other items of overhead. We are very fortunate, however, as we have very few charges to make, but we have some. If it is occurring too often we also make the knitting men stand some of the charge, just depending upon the nature of the bad work. If the fault lies in the bleaching or dyeing we charge it back to the fault when paying the invoice. Our knitting room foreman makes a regular inspection of all the machines as well as do the knitters themselves. It is up to him to see that the cloth is knitted properly and the keeping of the knitting room records.

A defect is anything that cannot be cut out in the cutting room, whether it be a spot or hole or a drop. However, in many instances a drop stitch can be picked up by hand similar to knitting with a regular latch needle, on the wrong side. If this is possible, we do it. This is done by either one of the foremen or the knitter before dyeing or bleaching or afterwards.

All off falls or waste must be used up or cut up immediately by our system so at all times our cutting room is clean of odds and ends.

I trust "H. G." can understand my system. It is not elaborate or complicated, but gives the desired results.

P. O. (PA.)

Plaiting Artificial Silk on Cotton.

EDITOR COTTON:

I note in the September issue that "R. L. M. (Tenn.)" is having trouble with plaiting 150 denier artificial silk on a 70s single mercerized cotton, using Banner machines. I take it for granted that the stitch cams are in good shape, and hollowed out properly at the drawing point so that they will ease the stitch at the drawing point, and also that the end cams are in good shape.

I am now working Banner machines with drop stitch attachments, and am using 150 denier artificial silk and plaiting it on 70s/1 mercerized cotton with good results. I am using a yarn stand and a special tension which is termed a plaiting device or equipment, and of which I am sending a rough sketch herewith. The cone or bobbin of artificial silk is put on this special stand, Fig. 1, and run up through

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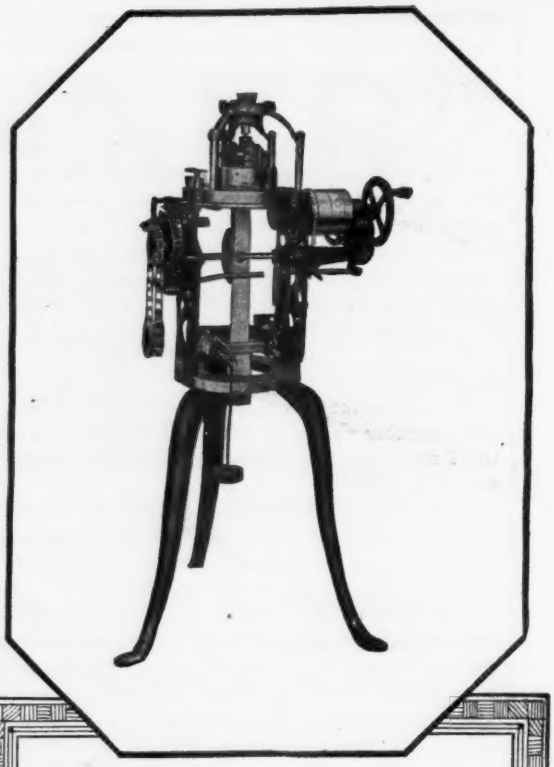

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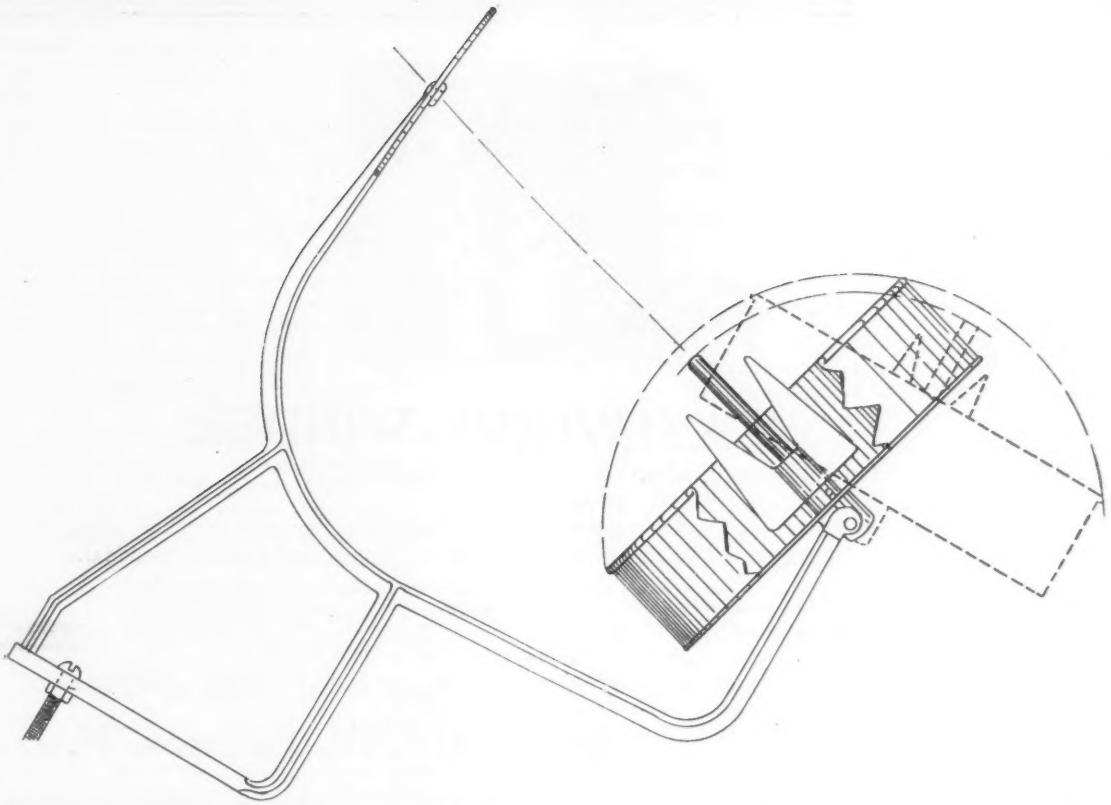


Fig. 1. The yarn holder is fitted so the cone or bobbin is on an angle. The two-inch deep pan is fastened to the bracket with the cone holder, and is fastened on a hinge so as it can be moved upright for putting on the cone or the bobbin. It will be noticed that the cone or bobbin is on an angle when the silk is running off, and when the machine is in the heel and toe it leaves the silk hanging loose, and the two-inch deep pan prevent its getting under the cone or bobbin.

the eyelets of the regular bobbin rack or ring to the eyelets in the oil cup; the silk should barely touch the wick in the oil bottle. The silk then goes through the three eyelets of the special tension, shown in Fig. 2 and Fig. 3, which is fastened to the yarn rack at the top so that it is over the take-up stand on the bracket. Then down through the eyelet of the take-up stand on the right or left side, whichever is not being used for the heel and toe, or through one of the eyelets of the guide, which is fastened to the take-up bracket, which I would term a yarn separator. Then it goes into the plaiting finger which should have porcelain eyelets in each hole. This tension should be adjusted to weight so that it will not go up to its highest point within 1/16th of an inch with the weight hanging on it to the extent of 35 to 40 hundredths of an ounce. This test weight can be made of small washers put on a piece of light wire with a hook on the end to hang in the tension. Another method is to use a spring with an adjustable tension as shown in Fig. 2. The 70s single is run free.

There are three sinker cams in the sinker ring for making drop stitch hosiery, two are movable ones and they make the drop stitch on the high and medium butt sinkers; the stationary sinker cam works on all three lengths of sinkers and should be set so that the point of the cam is 7/32 inch from the sinker cap. In some drop stitch machines the two movable sinker cams that operate the high and medium butt sinkers do not come to a sharp point, but at the high part of the cam they have a blunt point of about 1/16th inch, and in this case the stationary cam, which has a sharp point, should be ground so that the point of the stationary cam is in the center of the blunt points of the two movable cams, when they are pushed in all the way. Should it so happen that the point of the stationary cam is not in the center of the two movable cams when pushed all the way

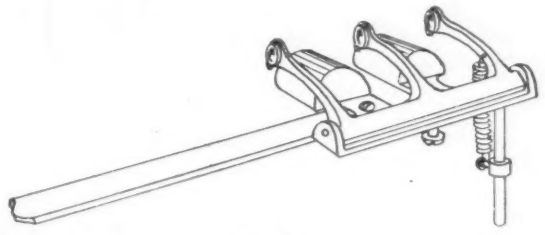
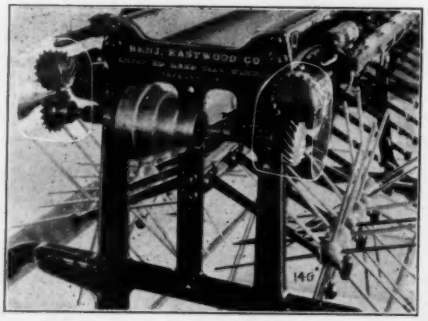


Fig. 2.

in, the stationary cam should be ground in the front, using a small emery wheel about 2 or 2½ inches in diameter, or of about the same radius as the cam is in front, grinding back until the point comes in the center of the two movable cams. In grinding care should be taken not to take any off the point, nor in any way grind the movable cams, as they are only case-hardened. In case of a nick, just polish with emery cloth.

Then there is a sinker cap where all three cams are to a sharp point. In this case the stationary cam should be ground so that the point is just a fraction beyond the point of the two movable cams. In either case the stationary cam should be set 7/32 inch from the sinker cap.

If, after these sinker cams are properly adjusted, the plaiting is still uneven or scattered and fuzzy, then raise



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the latch ring a little at a time until the plaiting comes up clear. Also see that the sinker cap is adjusted properly. In other words, see that there is the proper lead on the sinkers.

In case the silk cuts off, I think it will be found that the feed-in is too low; in other words, if a tight stitch is being

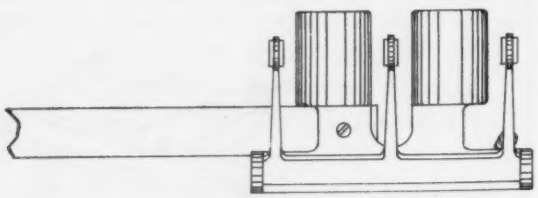


Fig. 3.

knit it will be noticed that the silk is getting down so low that it is going right down close to where the latch is riveted and in this case it acts like a pair of shears. To overcome this I would either raise the latch ring or grind out a little more in the hollow of the stitch cam close to the drawing point so as to ease up on the stitch.

In some cases, when plaiting or making drop stitch work on Banner machines, the sinker will break off at the nose. If this occurs, the trouble can be traced to the binder plate being too low or too close to the needles so that the sinkers strike it. Either raising the plate or grinding some off and beveling it will overcome this trouble. In case the butts are breaking off the center sinker cam should be ground or eased up in the front. OLD KNITTER (PA.)

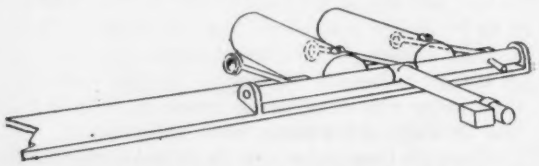
EDITOR COTTON:

Responding to the question in the September issue about plaiting an artificial silk over a 70s/1 mercerized cotton yarn, our method is to place a sufficient drag on the cotton yarn to hold it constantly smooth while running into the first finger and second hole. The silk should be run through the front hole of the middle finger with a slightly heavier drag than on the cotton. This arrangement of feeds and tensions should so regulate the yarns as to place the silk directly over the cotton as they approach the needles, and give a very satisfactory plaiting. E. T. (GA.)

EDITOR COTTON:

In reply to "R. L. M. (Tenn.)" as to how to plait artificial silk on cotton. We run about 50 Banner machines, plaiting 150 denier artificial silk on 80s mercerized cotton yarn.

We run the artificial silk through a tension like that shown in the accompanying sketch. This has a little adjust-



able weight at the end of the lever on a pivot. When a knot goes through it pulls the weight up—and then it flies back into place again.

We use a tinted mercerized yarn to get the best results. We keep as little tension as possible on the mercerized yarn, and in plaiting we find that it is a good thing to keep the needles as straight as possible. We use a needle with a good hook on it. On 220 and 240 needle work we use a 48-gauge, 66 hook for plaiting and get good results. We

set the sinker about three in and keep the yarn carrier about 1/32 inch from the head of the needles. We set the sinker cam at 7/32. We set the stitch cam with the banner stitch-cam gauge.

We also use a ballooner on the yarn which is made of a piece of ⅛-inch round wire to which is fastened a porcelain eye, which is put about two inches above the cones. We have the cones set on cotton to keep the silk from going under the cones. This ballooner causes the yarn to balloon and not catch on the knots. N. S. (PA.)

(In response to the question of "R. L. M. (Tenn.)," the following answer has been received relative to the problem of plaiting a 150 denier artificial silk on a 70s mercerized cotton yarn, propounded in "R. L. M.'s" query.—The Editors.)

In plaiting artificial silk over mercerized cotton, the important factor is not so much properly adjusted tension as properly softened artificial silk wound uniformly.

Artificial silk having a wiry characteristic naturally would cause difficulty and poor results when not properly softened. Inasmuch as artificial silk when in this wiry condition will jump from the cone at times catching underneath the cone, thereby causing a jerky flow of yarn, and when loose a very light flow of yarn, this giving irregular results when plaiting.

In softening artificial silk we suggest the use of a neats foot oil emulsion to be used in the following manner: When winding the artificial silk the emulsion is placed in troughs on the winder; that is, the troughs containing nickel-plated rolls over which the artificial silk passes. The nickel-plated rolls draw enough solution or softening emulsion from the trough to properly soften the silk. One thing must be borne in mind, that artificial silk when softened should be used as soon as possible, as moisture assists in the softening of the yarn, and when artificial silk is allowed to stand this moisture is liable to evaporate.

Some of the problem would therefore be properly softened artificial silk wound uniformly. This will give good results, with careful adjustment of tension devices in plaiting.

E. M. SCHENKE, Research Fellow,
National Association of Hosiery and Underwear Manufacturers.

Humidifying Knitting Rooms.

EDITOR COTTON:

Your correspondent, "C. S. (Mass.)," raises an interesting and important question in relation to a matter which is generally misunderstood. The deposit of free moisture—that is, water in the form of droplets or minute particles of unevaporated spray—on any polished steel surface will of course cause rust unless it is immediately removed.

Knitters as well as other users of humidifying equipment have doubtless suffered somewhat from rust arising from such causes in years past. We need only look back a few years to the time when humidifying equipment was far less well developed in point of performance than it is today. The introduction of automatic regulation prevents the occurrence of excessive humidity which might otherwise result in cold rainy weather, and the improvement of humidifying apparatus in respect to the quality of spray delivered has further minimized what undoubtedly was at one time a serious risk.

Any locally-distributed humidifying system should consist of humidifying units which deliver spray of uniformly-fine quality which will evaporate before deposition can occur. Care should be used in the design of the system and the location of the units so that an injury to any part of the system which might produce a temporary leak would cause no damage. The danger of damage to knitting machinery by the deposition of water from humidifiers is no greater and no less than it is in the card room of any spinning mill. There is no reason why knitters should suffer more from the consequences of rust by deposition of moisture than users of carding machinery do.

All spinning mills adopted humidifying equipment long ago as a matter of course and yet the knitters appear to fear damage to their needles and to hesitate to use humidifying equipment although the danger of damage is very remote. I need hardly say that there are numerous devices upon the market from which the knitter may select his equipment. He should be sure that he chooses one of established reputation and should see that it is installed with reasonable care and includes a reliable automatic regulating equipment.

There is one other important condition which may result in rust and which is dangerous to knitting machinery and to any other type of textile machinery as well. If a mill and its contents be allowed to cool down to an unusually low temperature over a week-end shutdown, all of the metal in the machinery will be reduced to a correspondingly low temperature. When the mill is started up if the temperature of the air is suddenly raised and the humidity is also raised, the air in the factory will quickly reach a condition where its dew point, or temperature of condensation, is higher than the temperature of the metal, which will necessarily rise much more slowly than the temperature of the air. When the dew point exceeds the temperature of the metal, moisture will immediately commence to condense upon its surface just as it does on a silver ice pitcher in muggy summer weather and rust may then result, but this condition is quite likely to occur even in a mill which is not equipped with humidifiers. In fact, many of your readers have seen it occur in the case of machinery which is stored in cold rooms where the temperature and humidity change with the weather.

The remedy for this condition is to make sure that your factory is not allowed to become too cool during shutdown periods, and spring and fall conditions are just as dangerous in this respect as winter conditions.

Humidifying by the central station method will of course eliminate such small risk of rust as is represented in a system of locally-distributed units, but the expense of this method makes it less popular than local distribution. The claim is made for saturated air humidifiers that they possess the advantages of both types. Saturated air humidifiers, however, have a very low humidifying capacity and it is not commercially possible to install them in units of sufficient number and size to equal the performance of locally-distributed spray heads or atomizers. On the basis of equal evaporative capacity suitable for high humidities and positive automatic regulation a saturated air system will be so bulky and so expensive that comparison will indicate the desirability of a different method.

The knitters have been more conservative than other textile manufacturers in availing themselves of the advant-

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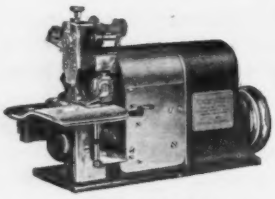

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ages of modern humidifying equipment and automatic regulation but those knitters who have taken the plunge are unanimous in reporting substantial gains in quality and quantity of product, and I do not recall hearing any complaints from them in regard to rust.

The writer can refer your correspondent to several successful knitters who are thoroughly converted to humidification and report that they are realizing marked advantage.

CONTRIBUTOR No. 3567.

EDITOR COTTON:

In reply to the inquiry in COTTON regarding humidifying knitting rooms where spring-needle machines are operated, will say that for five years we have used the Parks-Cramer humidifying system in our knitting department where 100 spring-needle rib machines are operated on night and day schedules, and it has been our experience that humidification of the knitting room aids to a considerable extent in the winding and knitting of yarn, especially yarns which are received at times in a brittle and highly twisted condition.

There never has been any rust on needles or machines or any metal equipment in the knitting department, and we are prepared to recommend humidifiers for knitting rooms, based on five years of successful experience with them.

CONTRIBUTOR No. 62.

EDITOR COTTON:

I notice one of your readers is asking for information in connection with humidifying the knitting room, and am pleased to give you herewith our opinion based on an experience along this line. We are equipped with the Parks-Cramer turbo-humidifier system in our carding, spinning, winding and knitting departments, and have placed an order to extend the installation to our cutting and sewing departments.

There is no danger of rusting any machinery when the humidity is properly controlled, as it is possible to keep, at all times, an even degree of humidity in each room.

If our understanding is correct, it is only a few years since a perfect control of humidity has been obtained, which automatically broadened its field.

When making an installation one would do well to use the combined heat and humidity control as eventually they will come to it.

All of our knitting is of the spring needle type, using cotton, mercerized, pure silk, spun silk, artificial silk, wool, merino, and worsted yarns in many sizes and on various gauges. To us the investment in humidifying has been an excellent one, and we believe that any knitter would be benefited by such an installation, but to what extent would depend upon existing conditions in the individual mill and what they were trying to overcome or accomplish. Anyone processing textiles will appreciate the great advantage of maintaining an even and sufficient degree of humidity and temperature in certain departments.

We are very glad to give, in a general way, our experience, and if there are particular points or questions, we shall answer them if possible. Also we appreciate the privilege of asking questions on subjects that are of interest to us, which we shall do when the occasion arises.

H. A. B. (N. Y.)

EDITOR COTTON:

Our knitting room has been equipped with humidifiers for quite a number of years, and we find them a very satisfactory addition to the department. Humidifying has to be controlled very carefully to prevent the rusting of needles, cylinders, dials, tables, etc., but we believe that this can be controlled so there will be no trouble. The advantage from our standpoint is that it keeps the dust out of the knitting room, for one thing, and it will also make knitting a little better, but as stated, extreme care must be taken not to release too much humidity as this will cause damage to the machinery to a very large extent.

S. L. (N. Y.)

EDITOR COTTON:

In response to your inquirer's question regarding humidification of knitting rooms, will say that we have a Parks-Cramer turbo-humidifier system installed in our carding, spinning and knitting departments, which is operated only during the time that the buildings are heated by steam. During the late spring, summer and early fall, the natural humidity of the atmosphere is higher in these rooms than the artificial humidity is in the winter.

This installation is very satisfactory, and enables us to make finer woolen yarns and to knit fine cotton and worsted yarns to better advantage than if we did not have it. It eliminates static electricity and makes the cotton and worsed yarns more pliable and easier to knit on spring needles. It does not rust anything—in fact summer humidity, as we said before, is higher at times than the artificial humidity. The automatic controls on the system can be set to give just the amount of moisture required.

M. N. (N. Y.)

"Knitting Kinks" Helps a Reader.

EDITOR COTTON:

I was indeed glad to read in "Knitting Kinks" in September COTTON the letter of "T. D. S. (Ga.)." We also make a wool stocking and we were having difficulty getting the yarn to work. We did a lot of experimenting with oil. After reading the letter of "T. D. S." we tried the gasoline poured on the cone and are glad to say this helped us out.

This goes to show that we can learn by reading "Knitting Kinks," and if we fellows will just keep on giving our experiences COTTON will have by far the best department for us on the market.

J. A. D. (PA.)

Bulletin H288, on "Ball-Bearing Motors for the Textile Industry," recently issued by Fairbanks-Morse & Co., Chicago, is of interest to mill men. Ball bearings were adopted by this company as standard equipment on its motors over ten years ago. Friction losses are reduced to a minimum and the absence of bearing wear keeps the rotor in alignment and prevents burnouts, it is claimed. The bearings are packed in grease, which provides ample lubrication for a year. There is no oil to work into the windings and damage the insulation, or drip outside the motor onto the floor or merchandise.

These and other advantages of ball-bearing motors are outlined in this booklet, which also lists Fairbanks-Morse Type T motors for individual drives on looms and similar machines. Type H for two and four-frame drives, and Type EH enclosed and ventilated motors for opener- and picker-room drives.

Output Calculations on Hose Machines

BY WILLIAM DAVIS, M. A.

Many matters hang on the output of a hosiery manufacturing plant in addition to the satisfaction of learning whether the machines are turning out their full quota of goods. One of the most important is the costing element, for the machine output divided into the cost of working the machine gives the item which has to be added for this particular work. The practical details relating to this phase have already been dealt with in recent articles and these will have paved the way for a full consideration of the subject. In describing the construction of the chain of an automatic hose machine, it has been made clear that the lengths of the various parts of the hose depend on the number of links placed in the chain to work the top, leg, heel, toe and foot and when these particulars are obtained for any article along with the speeds of the machine, when working circular and reciprocating motions respectively, it becomes possible to figure out the time required to produce a pair of stockings or socks from which the output per machine, or per worker on a number of machines can be estimated, allowing for the loss due to stoppages. The calculation of the full production possibilities reveals possible weak places in the organization, it shows which machines are below par, and it also enables the management to select its operators according to their skill and success in keeping the machines in constant operation.

To outline the system of calculating from basic principles, let us take an example of a machine working on seamless hose, where the particulars taken from the chain are as follows: 80 links for the leg, 10 links for the foot; the heel and toe contain 80 courses each. The machine runs at 250 courses per minute when on the leg and foot, but on heel and toe the speed is halved to 125 courses per minute.

From these particulars we have a combined number of links in the leg and foot of $80 + 10 = 90$ with 12 courses for each link this gives 1080 courses. As these are inserted at the rate of 250 per minute, this will provide $1080 \div 250 = 4.3$ minutes required for leg and foot. Similarly, the heel and toe $= 160 \div 125 = 1.28$ minutes for heel and toe. $4.3 + 1.28 = 5.58$ minutes required to make one stocking. Now the output of a hose machine is generally stated as the number of dozen pairs per day of 8 hours, and this figure can be obtained simply as follows: $8 \times 60 = 480$ minutes per day. 5.58 minutes for one stocking means 11.16 minutes per pair and this multiplied by 12 and divided into 480 $= \frac{8 \times 60}{11.16 \times 12} = 7.1$ dozen pairs for one machine per day of 8 hours. This does not account for loss due to stoppages, and as these are seldom less than 10 per cent and often more the production requires to be reduced by this proportion.

To obtain the production per worker, it is essential to state the number of machines tended by one operator and for plain machines a female worker can generally look after 8 or 10 while a male operator is entrusted with two or so more than the girl worker. Knowing these factors and also the wages paid for the work it is possible to work out the cost per dozen pairs with accuracy. But there is to be added another item and this is the cost due to the mechanic who keeps the machines in repair; as a rule one mechanic is employed for every 40 machines and his wages are in general twice or 2½ times the wage of the operator.

In this example for 10 machines to one operator this would bring the output per worker to $7.1 \times 10 = 71$ dozen pairs per working day, less 10 per cent stoppages $\frac{71 \times 90}{100} = 63.9$ dozen pairs. Let the wages paid to the worker per day for this quantity, for example, be four dollars, let the wage of the mechanic be 2½ times this for 40 machines, then the proportion for the set of 10 will be one-fourth; $\frac{2\frac{1}{2} \times 4 \text{ dollars}}{4} = \$2.50$, added to $4 = 6.50$ dollars. This divided by 63.9 dozen pairs of stockings for the time stated will give the cost per dozen due to those two items. $6.50 divided by 63.9 dozens = 10.1 cents per dozen for those two items of working expenditure.

As this calculation has been built up step by step, it is clear that this important item is capable of quite accurate treatment, but the practical manager will want to devise a short cut to these particulars. In devising this he should look out for the variable factors in the chains and make a calculation of the difference produced by different lengths of leg or foot on these items. For example, it is common in one gauge of machine for the heel, toe and length of foot to remain uniform with small adjustments in the length of the leg according to individual requirements. Let us estimate the difference in production by removing 5 links from the leg, this, with 12 courses per link, will give a reduction of 60 courses, and with 250 courses per minute, this would give a $\frac{60}{250} = .24$ minute or practically a quarter of a minute per single stocking less time by removing these links. Expressed as a percentage of total time $5.58 = \frac{.5 \times 100}{5.58} = 4.3$ per cent reduction in the time required to produce one stocking. From this figure it will be possible to state the difference in time by adding or removing any number of links from the chain, 5 links less giving 4.3 per cent reduction in time taken.

Let another example be cited of a hose machine working at 275 revolutions per minute; there are 1,000 courses on leg and foot. It works at 140 revolutions or courses per minute on the heel and toe which have a total of 120 courses of loops. Allow 10 per cent for stoppages.

For leg and foot the time is $1{,}000 \div 275 = 3.6$ minutes. Heel and toe, $120 \div 140 = .8$ minutes. $3.6 + .8 = 4.4$ minutes total. 4.4 minutes for each hose $= 8.8$ minutes per pair.

In an 8-hour day we have 8×60 minutes, and this divided by 8.8 and 12 will give the total dozens of pairs produced in a day $\frac{8 \times 60}{8.8 \times 12} = 4.5$ dozen pairs per day, less 10 per cent $= 4.5 - .45 = 4.05$ dozens.

Let us compare this production on a fast running machine with that obtained on a slower machine with the following particulars: 250 courses or revolutions per minute on leg and foot, 125 courses per minute on heel and toe. Leaving the hose particulars the same we obtain the following particulars: $1,000 \div 250 = 4$ minutes for leg and foot. $120 \div 125 = .96$ minutes for heel and toe. This gives $4 + .96 = 4.96$ minutes total for a single stocking $= 9.92$ minutes per pair. $\frac{8 \times 60}{9.92 \times 12} = 4$ dozen pairs per day, less 10 per cent $= 4 - .4 = 3.6$ dozens per day.

Comparing this figure with the last example we have $4.05 - 3.6 = .45$ dozen pairs less on the second machine. .45 of a dozen pairs $= \frac{45}{100} \times 12 = 5.4$ pairs less per day.

To compare the cost of production let us take the first figure of 4.5 dozens per day on one machine $= 45$ dozens per operator on 10 machines, less 10 per cent $= 40.5$ dozens Taking \$4 as the wage, $\$4 \div 40.5 = 9.8$ cents per dozen. Let \$2.50 be the wage due to the mechanic which will give a total of $4 + 2.50 = \$6.50$ for 40.5 dozen pairs. $6.50 \div 40.5 = 16$ cents per dozen for working, taking worker and mechanic together. Following this out in the second example, 4 dozens on each machine $= 40$ dozens on 10 machines and this with 10 per cent deducted gives 40 less $4 = 36$ dozens. If this costs \$6.50 as before, then the price per dozen for working is given by $6.50 \div 36 = 18$ cents, nearly. Comparing the two methods of production, in the first case this item comes to 16 cents per dozen pairs, whilst in the second case the cost is 2 cents higher for doing the same work. Now in making an ultimate comparison it will be necessary to tabulate the yarn losses for needle breakage, waste of material due to the higher speed of the machines and, lastly, the number of needles which are broken per week. If these items are the same in both cases then we stand to have a clear gain in production, but if the losses due to yarn waste, needle consumption and so on are increased then there may be a distinct loss, and it will serve better to adopt the slower speed.

Let us take another example in a children's stocking as made on a hose machine where the rib top and plain leg and foot are obtained on one and the same machine without any transferring of the top pieces. Let there be 450 courses of knitting in leg and foot, with 30 courses in the heel and 30 in the toe, giving a total of 60 for reciprocal knitting. The speed on the leg and foot is 250 revolutions or courses per minute and on the heel and toe 120 courses so that the time to produce the articles is figured out as follows: A worker minds 8 machines.

Leg and foot, $450 \div 250 = 1.8$ minutes; heel and toe, $120 \div 60 = 2.0$ minutes; these added $= 3.8$ minutes for a hose or 7.6 minutes per pair.

In a day of 8 hours the output per dozen pairs is shown as follows: $\frac{8 \times 60}{7.6 \times 12} = 5.2$ dozen pairs per day per machine or 41.6 dozen pairs on 8 machines. Less 10 per cent stoppages, 41.6 less $4.1 = 37.5$ dozens per day. Taking the cost of worker and mechanic for this output as before we have $\$6.50 \div 41.6 = 15.6$ cents per dozen.

Take further examples on the same lines and it will be noted that in all such calculations involving the 8-hour day, number of machines per worker, etc., that certain figures always appear which it will be well to boil down into what is termed a gauge point or constant; for example, in figuring the dozen pairs production per day, we always have the following figures in the formula: $\frac{8 \times 60}{12} = 40$ as the constant; less 10 per cent it would be $40 - 4 = 36$, so that if the time required for one pair be multiplied by 36 this will give the production in a day on the 8 hour 10 per cent stoppage basis.

Let us take the production of an automatic rib sock machine, where the speed on the leg and foot is 200 revolutions or courses per minute, with that of heel and toe 100 courses per minute. There are 650 courses in the leg and foot and a total of 80 courses in the heel and toe. Leg and foot time $= 650 \div 200 = 3.5$ minutes; heel and toe time $= 80 \div 100 = .8$ minutes $= 4.3$ minutes per sock or 8.6 minutes per pair. Using the constant $36 \div 8.6 = 4.19$ dozens per day output. If the cost for worker and mechanic is again \$6.50 the figure per dozen pairs for 8 machines is given by:

$4.19 \times 8 = 33.52$ dozs. $\$6.50 \div 33.52 = 19.4$ cents per doz.

The other important factor relating to the cost finding of hosiery is the element of weight. The yarn is purchased by the pound, hosiery yarn being largely packed in hanks in 10-pound bundles and the weight of material employed per dozen articles is an important factor. But it is the weight of yarn which is required to produce the articles from start to finish which must be taken; it is not merely a case of weighing the goods and hence making the calculation. This is particularly so in woolen goods, and if we follow a bulk lot of yarn as bought, on through the processes, weighing and gathering the waste, etc., at each stage, from 5 to 8 per cent of the bulk lot will fail to be accounted for in any shape or fore, this loss being named in the trade "invisible waste." Thus, in costing such goods a percentage amounting to 5 per cent on the average must be included or a serious discrepancy will appear in the profits. This curious loss has been found to be more common in knitted goods than in woven and one cause is due to the higher degree of temperature at which hosiery manufacturing is in general carried on in the workrooms, these being heated in many districts in winter to 20 degrees F. higher than is the case for woven goods. The reason is stated to be that knitting machinery is delicate in its needle adjustments and these go wrong if the temperature is not kept at the point stated. A more potent reason which operates all the year round, in the case of woolen goods at least, is the violent changes in temperature which the goods are subjected to in the finishing room, the most serious loss being found to occur after the operation of pressing with hot plates. This appears to administer a shock to the constitution of the wool fiber which prevents its ever again absorbing even that amount of moisture which is allowed in a woolen article. Much of this can be prevented if the finishing operations are conducted with as few fluctuations in the temperature as possible, avoiding as far as one can the sudden application of hot surfaces to the goods.

The weight of material made on a hose machine can be calculated on first principles, provided that the take-up of the yarn in the machine is first determined. By this is meant the length of yarn which it requires to produce a circle of loops on the machine. This can be done very

readily by running in a given length of yarn marked in yards or half yards and finding how many rounds of knitting are produced from it. This is generally stated as a figure such as 2½, 3, etc., according to the length measured. This will enable us to calculate the weight of the leg and foot parts but the heel and toe sections present rather different treatment. The heel is started on one-half of the needles in the cylinder, these being reduced by a needle at each side at each course until only about one-third of the original number remains. At the same time, however, an extra thread of yarn, termed splicing, is introduced which compensates to a large extent for the reduction in the number of loops in work.

For the present let the total number of courses on heel and toe be halved to give full courses, this being rather more than is really the case, but the splicing compensates for it in large measure.

Take the example of the hose formerly quoted with 1,080 courses on the leg and foot. 160 on the heel and toe = 80 full courses, so that the total number of full courses in the stocking is given by 1080 + 80 = 1160. Let the machine be 3¾ inches in diameter and the take-up figure 2½, then the total number of inches in the stocking will be given as follows: $3\frac{3}{4} \times 3\,1/7$ = circumference. $1160 \times 3\frac{3}{4} \times 3\,1/7 \times 2\frac{1}{2}$ = inches in stocking, divided by 36 gives yards of yarn. This figure multiplied by 24 = inches of yarn in 24 stockings or one dozen pairs. And this figure ÷ 36 = yards of yarn in 24 stockings.

Let the counts of yarn be 20s cotton single = 20×840 = yards per pound, and this divided into the total yards per dozen pairs will assuredly give the weight per dozen in pounds.

$$\frac{1160 \times 3\frac{3}{4} \times 3\,1/7 \times 2\frac{1}{2} \times 24}{20 \times 840 \times 36} = 1.35$$

pounds per dozen pairs of hose.

Now in a calculation of this complexity, it is easy to miss out one or other of those small figures and in a class of students very few of them ever get this type of problem arithmetically correct. This being the case, for any given type of machine it is well to boil down the numbers which appear in every calculation of this character and make a constant which, when treated by the variables, will give a quick result which will be accurate. In the foregoing statement the following numbers will be common to all formulae appearing under the same conditions as regards width of machine, take-up, etc., and these figures are shown below:

$$\frac{15 \times 22 \times 5 \times 24}{4 \times 7 \times 2 \times 36} = 19.64 = \text{K or constant.}$$

Using this constant, find the weight per dozen hose on a style having the equivalent to 1164 courses of 2/48s worsted counts.

$$\frac{19.6 \times 1164}{24 \times 560} = 1.7 \text{ pounds per dozen.}$$

Similarly to find the weight of silk hose made from 250 denier, say, we should proceed as follows: to translate Denier artificial silk into cotton counts the constant is 5282.5 and if this is divided by the deniers counts the result in cotton counts will be found:

$$5282.5 \div 250 = 21.1\text{s cotton counts.}$$

Let there be 1200 courses in the article, and the weight will be found as follows:

$$\frac{19.6 \times 1200}{21.1 \times 840} = 1.3 \text{ pounds per dozen pairs of hose.}$$

Find the weight per dozen in a machine having 3¼ inches diameter of cylinder, with a take-up of 2, there are equivalent to 1000 courses in the article and the yarn equals 24s worsted counts.

$$\frac{1000 \times 13 \times 22 \times 24}{24 \times 560 \times 4 \times 7 \times 36} = 1 \text{ pound per dozen pairs.}$$

Find the weight if the counts are altered to 18 worsted with other particulars the same. The weight will be proportional to the yards per pound of the two counts as follows:

$$\frac{24 \times 560}{18 \times 840} = .88 \text{ pounds per dozen.}$$

The prevailing fashion at the present time in fancy hose is to have a horizontal stripe with artificial silk yarn introduced in wool or cotton or both. Let us work out the weight of such an article with the following particulars.

Equivalent to 1000 courses per stocking, 3¾-inch cylinder, 2¼ take-up. The pattern of the hose is 4 courses 2/48s worsted counts and 2 courses 300 deniers artificial silk.

One method is to set out the two yarn counts in separate formulae giving the proportion as $\frac{4}{6}$ in the case of the woolen and $\frac{2}{6}$ for the artificial silk.

$$\text{Worsted} = \frac{1000 \times 15 \times 22 \times 9 \times 24 \times 4}{24 \times 560 \times 4 \times 7 \times 4 \times 36 \times 6} = .87 \text{ pounds}$$

for worsted.

For the artificial silk yarn we can convert 300 deniers into cotton by using the constant 5282.5 as before: 5282.5 ÷ 300 = 17.6 cotton.

$$\frac{1000 \times 15 \times 22 \times 9 \times 24 \times 2}{17.6 \times 840 \times 4 \times 7 \times 4 \times 36 \times 6} = .4 \text{ pound due to}$$

silk. .87 + .4 = 1.27 pounds per dozen pairs.

We can take this problem a different way and find the average counts of the two kinds of materials, thus: 4 = 2/48s worsted = 24s single = $\frac{24 \times 560}{840}$ = 16s cotton equivalent, 4 threads $\frac{16}{4}$ = 4s resultant. 300 deniers artificial silk = 17.6s cotton, 2 threads = $\frac{17.6}{2}$ = 8.8. Folding 8.8 and 4s together we have:

8.8 hanks of 8.8 = 1 pound
8.8 hanks of 4. = 2.2 pounds

8.8 hanks of twist = 3.2 pounds

(8.8 ÷ 3.2) × 6 (threads in pattern) = 16½s average

This 16½s cotton is the average counts of the two threads

(*Continued on page* 106.)

Among the Knitting Mills

The William Carter Company, of Needham Heights, Massachusetts, have acquired all the holdings of J. C. and D. C. Collier in the Carter-Collier Co., underwear manufacturers, at Barnesville and Macon, Ga. J. C. Collier, who was chairman of the board of directors and D. C. Collier, who was treasurer and general manager, have resigned and now have no financial or official connection with the company.

Up to two years ago, the company was the Collier Mills, Inc., manufacturers of "Collier Cut" union suits and other knitted undergarments for men, women and children. A connection then was established with the Carter company, and the organization became known as the Carter-Collier Company, the products going direct to the retailers.

J. A. Cason, former secretary of the Collier Mills, Inc., remains with the William Carter Company as general manager of the Barnesville and Macon plants.

Rollins Hosiery Mills, Des Moines, Iowa, have plans for the erection of a one-story addition, 65x100 feet. Lockwood, Greene & Co., Chicago, are the architects.

The Campbell Knitting Mills, Jellico, Tennessee, have acquired the Diamond Hosiery Mills at Jellico, and will install 150 additional machines, bringing the total to 325. The plant produces men's, women's and children's hosiery, with a daily capacity, when the addition is made, of 1,200 dozen pairs. R. L. Moore is president and T. J. Campbell is vice-president and manager.

Galax Knitting Mill Corporation, Galax, Virginia, have plans for a new building to house 200 machines for knitting, and equipment for finishing, dyeing, labeling and packing hosiery.

The branch of the Chester Knitting Mills, at Rome, Georgia, is installing additional machinery for manufacturing.

Rockford Mitten and Hosiery Co., Rockford, Illinois, will erect a one-story addition to its mill, to be 80x110 feet.

The Real Hosiery Mills, Icard, N. C., recently incorporated, have taken over the Frazier Hosiery Mills, and will install 34 additional knitting machines. Stanley Berry is president; C. A. Martinat, vice-president; C. S. Grove, secretary, treasurer and manager.

E. A. Boyer, president and treasurer of the Bowman Knitting Mills, Inc., Bowmanstown, Pa., has acquired the local plant and equipment of the company at a receiver's sale. The purchaser plans to improve the mill, which has been closed down for several months past, and purposes to resume operations at an early date, giving employment to a full working force.

The Rayon Knitting Mills, Inc., New York, N. Y., has been formed with a capital of $30,000, to operate a local plant, for which arrangements will be perfected at an early date. The new company is headed by S. Leifer, A. H. Kurland and H. J. Auerbach.

The Allen Knitting Mills, Inc., Woonsocket, R. I., recently organized, plan for the operation of a local plant for the manufacture of a line of knit goods. The company is capitalized at 500 shares of stock, no par value. It is headed by George L. Murray and Thomas B. Wood, both of Woonsocket.

The Graham Powers Knitting Mills, Inc., Brooklyn, N. Y., chartered recently with a capital of $25,000, will operate a local plant for the manufacture of hosiery and underwear. The company will succeed to an existing mill, and plans for extensions and betterments for enlarged output It is headed by S. Thailer, H. Johnston and R. Reitman.

The Associated Knitting Mills Outlet Co., 304-6 Crapo Building, Bay City, Mich., has been formed to manufacture a line of knit goods and purposes to begin operations at an early date. The new company is headed by Russell H. Nelson and Vaughan Cooley, both of Bay City.

The Panelon Underwear Co., Melrose, Mass., has work under way on a new knitting mill in Attleboro, Mass., and plans for the early removal of its plant to this location. It is purposed to increase the capacity with the installation of additional equipment. The Attleboro Chamber of Commerce is interested in the project.

The Twentieth Century Knitting Mills, Inc., New York, N. Y., recently organized with a capital of $25,000, will operate a local plant. The new company is headed by E. Goldstein and F. Brumberg; it is represented by Tolins & Jakobson, 261 Broadway, New York.

The Masterknit Mills, West New York, N. J., lately organized, will operate a local knitting mill, with headquarters at 90 West Twentieth Street. Victor Berck heads the organization.

The Sunset Silk Hosiery Mills, Inc., Los Angeles, Cal., recently organized with a capital of $500,000, plan for the construction and operation of a knitting mill in this vicinity. It is said that the initial plant will cost close to $85,000, including equipment. The company is headed by C. B. Andrews, Majorie M. Williams and S. M. Frew, all of Los Angeles.

The Atlas Hosiery Mills, Inc., Philadelphia, Pa., recently chartered under state laws with a capital of $25,000, will operate a local knitting mill, for which arrangements will soon be perfected. Paul Swedosh, 1726 North Fifty-second Street, Philadelphia, is treasurer.

The Pollyanna Knit Wear Co., New York, N. Y., recently organized with a capital of $25,000, will operate a knitting mill in this section. The new company is headed by L. Brockman and M. Hyman. It is represented by O. A. Samuels, 358 Fifth Avenue, New York.

Giles & Hirsch, Inc., New York, N. Y., has been chartered with capital of $10,000, to conduct a local knitting mill, for which arrangements will be perfected at an early date. The company is headed by A. J. Riegelman, 67 Water Street, New York.

The Earl L. Green Knitting Mills, Inc., Bath, N. Y., has arranged for an increase in capital from $25,000 to $100,000, for general expansion in operations. Earl L. Green is president.

Pineus-Percik, Inc., New York, N. Y., lately organized with a capital of $1,000, nominal stock, will operate a mill in this vicinity for manufacture of a line of knit goods. The company is headed by W. and H. Pineus, and L. Percik. It is represented by B. Maywood, 291 Broadway, New York.

The West Branch Knitting Co., Milton, Pa., has taken over a building on Corning Street, Lock Haven, Pa., and will occupy at once for a branch knitting mill. The former plant located in the Getz Building, Lock Haven, will be

(*Continued on page* 106.)

The Yarn Market

The Philadelphia yarn market during the past month, as it is reported here, presented a better tone. Its condition appeared considerably better from a fundamental standpoint, and signs were encouraging.

Our month was featured by the fact that it included two Government reports making estimate of the current cotton crop and giving its condition. These reports, together with the influence which they exerted upon raw cotton and through that influence their effect on yarn rates and activities, were the outstanding points.

Upon the strength of the September 23rd report, the rise in raw cotton rates approached a nickel. The result of this increase upon the yarn market, among other things, was to reveal quite a number of factors caught short; to move some consumers to action in taking yarns; and to bring about an eventual elevation in the carded section of the list, particularly.

Yarns thus entered into October on a higher level than that with which September was greeted. It developed after the ninth month of the year had gone, however, that while the first two weeks of the month saw the lowest quoted prices of the year, at the same time the actual business transacted exceeded that of August, the preceding month, and also bettered, by a considerable amount, that grossed for September of last year. It seemed that a large portion of these orders were booked during the first part of the month.

The second Wednesday in October brought another Government crop report which placed the estimate of yield some bit above what was generally conceded to be a fair propheecy. The effect of this, while cotton rates suffered comparatively as a result, was not so strongly felt on yarns. This was pointed out to be another substantial factor in the market. The failure of the report to wreck the equilibrium of the market was regarded as unusual.

Buying during the month reported, as best as could be determined for the market as a whole, continued on about the some plane as of previous months. Some consumers still appeared satisfied to wait out the market to see what happened eventually; some came to market on the strength of rising quotations; others believed the increase of short duration; others secured yarns to fill orders they themselves had received. It was evident that there was no general condition prevailing nor that any broad definition could be made to apply to the market in its entirety.

On the whole, however, better fundamental conditions seemed apparent. From the spinner's standpoint this seemed to be evidenced by the renewal of operations in many of the plants, putting the industry on more nearly a full-time basis. Conditions of industry over the country generally have improved very noticeably, and this fact contributed to the improvement in the yarn market. While some time, of course, is required for improvement of this kind to work its way back into the market, factors saw signs that this would occur.

As the month of October waned, prices seemed also on the downward trend as a result of several influences. The fluctuations in prices quoted are contributing much to the uncertainty of consumers as to booking for requirements, and most of them seemed to operate for nearby delivery to cover immediate needs.

As illustrations of the gains made in price during the month by certain prominent numbers, the following may be cited: On September 16th, 30s single warps were reported here at 46 cents, while the appended list of quotations posted for October 15th, show them placed two cents higher at 48 cents; and 50 cents is asked for 30s/2 warps on the latter date, which is 3½ cents above the quotation of a month previous. The carded section showed the larger increases, while it appears that the combed products seemed to maintain about the same level.

Following are quotations on the Philadelphia market on September 16th:

Single Skeins.

4s to 8s	39	10s	40½
12s	41	14s	41½
16s	42	20s	43
24s	44½	26s	45½
30s	46½		

Single Warps.

8s	40 @40½	10s	41 @41½
12s	41½ @42	14s	42½
16s	43	20s	42½
26s	46	30s	48

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slacks	40 @40½
8s 3-4 hard white warp twist	37½ @38
8s and 9s 3-4 tinged tube	35½ @36
8s 3-4 hard twist waste	35½ @36

Two-Ply Skeins.

8s	39½	10s	40½
12s	41	14s	41½
16s	42 @42½	20s	43 @43½
24s	45½	26s	46 @46½
30s	48 @48½	40s	53 @54

Two-Ply Warps.

8s	41 @41½	10s	42
12s	42½	14s	43
16s	43½	20s	43½ @44
24s	46 @46½	26s	47
30s	49 @50	40s	54½

Frame Spun Carded Yarn on Cones.

8s	38½	10s	39
12s	39½	14s	40
16s	41	18s	41½
20s	42	22s	43
24s	43½	26s	44
30s	45½	40s	53
30s double carled			46
30s tying-in			45

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	53	20s	55
24s	57½	30s	60
40s	65	50s	70
60s	75	70s	82½
80s	95		

Mule Spun Carded Yarn on Cones.

10s	44	12s	45
14s	46	16s	47
18s	48	20s	49
24s	50	26s	51
30s	53	40s	60

Mule Spun Combed Peeler Yarn on Cones

10s	50	12s	51
14s	52	16s	53
18s	54	20s	55
22s	56	26s	60
28s	61	30s	62
36s	64	38s	67
40s	69		

The new 1924 edition of the American Directory of the Knitting Trade is now available. This is a knitting industry directory, showing reports on knit goods manufacturers in the United States and Canada, with the usual information as to officers, equipment, product, etc. Another section shows the mills listed as to goods made; a special department shows concerns handling the dyeing, bleaching, printing and finishing of knit goods on a commission basis. Other valuable information also is included. The directory is published in two editions; the complete edition at $2.00, and a smaller edition containing only the classified lists of manufacturers, selling agents, jobbers and retailers, at $1.50. Bragdon, Lord & Nagle Co., 334 Fourth Avenue, New York, are the publishers.

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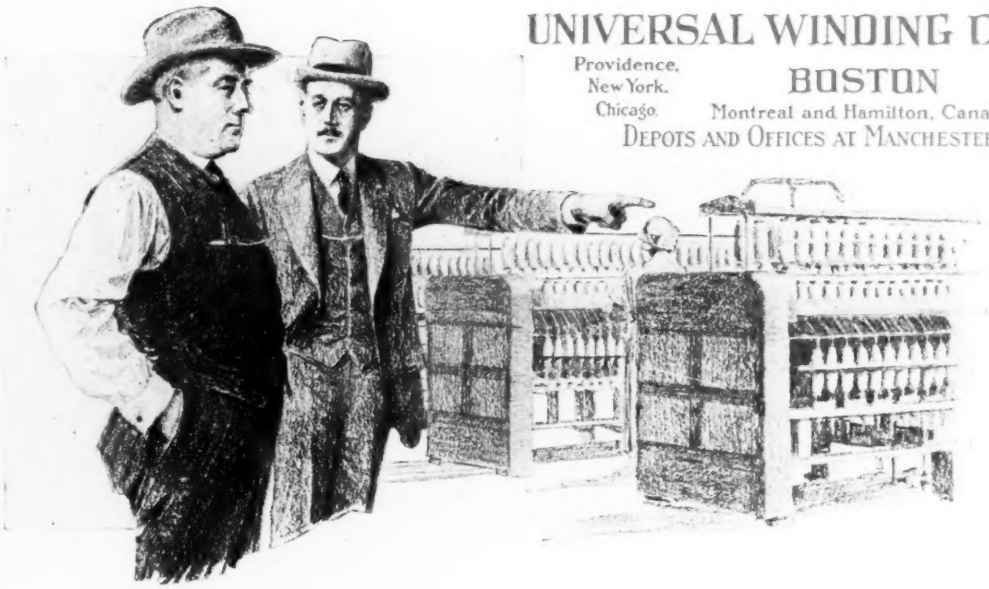

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The Knit Goods Market

Predictions of a more active knit goods market for September had their fulfillment. The increased volume of business in hosiery was, principally, in women's full fashioned silk and novelty half hose. Staples continued to lag, and there was some disappointment in the restricted orders for infants' socks and a falling short of the expected trading in some lines of misses' sports ribs.

Heavy weight underwear received more attention from jobbers, although retailers were ordering goods in with utmost caution. All interests appeared to be distrustful of values even while cotton was steadily moving to higher ground. The improvement in underwear was simply seasonal, and the brighter aspect of things in relation to winter lines was dimmed by jobber hesitancy to operate in more than a half hearted way in light weights for next year.

Sweaters and knitted outerwear generally moved in a somewhat jerky way, reports of fair business one week being followed by a slipping in the next. In this division it was the staples that found the better market. Unlike hosiery and underwear, knitted outerwear was not suffering to any appreciable extent by presumptive overproduction.

The slowness of the market for cotton goods could not truthfully be ascribed alone to the fear of a recession in cotton. It cannot be successfully denied that national politics and uncertainty of the outcome of the election, and the trend of subsequent legislation, were the big factors in the holding of trading in check. At any rate, buyers were in position to take advantage of a clouded situation due to doubt, and they overlooked no opportunity to so operate as to keep the market in their favor.

Back of prices of raw materials and the political situation was fear of coming economic disturbance. Reductions in wages which had gone in effect were looked on by many as the forerunner of a general adjustment of wage schedules in, more particularly, those industries in which employees, by maintaining more effective organization than employers, have been able to exact the pound of flesh and more. Competition had reached a stage where, it must be apparent, economy would have to be practiced where extravagance was the rule. In this respect, though, manufacturers, especially in staple hosiery and cotton underwear lines, had gone so far as to practically leave profit out of consideration in marketing their product. Between the mill and the consumer there remained much room for reform in this direction. For the time it seemed easier for distributors to force concessions at mills than scale the cost of distribution. They left manufacturers with but one alternative. If the threatened downward revisions of pay schedules be put in effect it will be because distributors would not pay mills living prices.

Output of hosiery has been radically curtailed since the first of the year, but it still is in excess of market requirements. Manufacturers and jobbers are in accord in this view, and the situation operates to the serious disadvantage of both, in price unsteadiness and the fact jobbers, being able to obtain deliveries as wanted, place comparatively few forward orders. In no line of hosiery has there been less profitable operation than in misses' ribbed goods, it appears.

No less than seven mills reported last month they had discontinued making, for the time, misses' 28-ounce coarse gauge cotton ribs, while most of the others had reduced their worktime schedule. They were quoted at 97½ cents, rise and fall five cents. Only mills with enormous production and exceptionally low overhead could break even at that price, and it was notorious that some were accepting 95 cents. One manufacturer who, after discontinuing the line, had to buy to complete an order, actually paid more for goods in the gray than he received for them finished. The extent to which curtailment was practiced is shown in Department of Commerce statistics, which reveal that output for July, making comparison with January, declined by 41 per cent, this applying to boys' and misses carded, combed and mercerized ribs. Yet the market seemed to be well supplied last month, as was indicated in unprofitable prices.

Misses' 300 needle combed ribs were reported sold last month at $1.35 a dozen, for a distress lot. This price, of course, was not representative of the market, but when it became known that there had been one sale at that figure it was more difficult to get value, which, comparing with 1923, would be in the neighborhood of $1.65-70 on very conservative figuring. It would appear that the plain combed ribs have suffered from competition with the fancy top seven-eights lengths to a greater extent than have the plain carded, and this is true also of the mercerized. The very cheap and the very sporty have crowded hard on the intermediate.

There was a good volume of business last month for practically all lines of low end cotton goods—men's, women's and misses', but it was so widely scattered, among so many mills, that only a few manufacturers could boast of a fair showing as to sales and shipments. One mill was operating at double shift capacity on 176 needle half hose with transfer top and selling the production. But its misses' rib machines were idle. A leading manufacturer of low end goods reported sales for September well in excess of those for the corresponding month of 1923. The orders for a two-weeks' period during the month aggregated approximately a half million dollars. This was exceptional business, of course, the result of a "drive" by one of the mill executives, who managed to get something better than the lowest price heard, but about 2½ cents a dozen less than he should have gotten. Misses' sports derby ribs, while for a time showing more life than almost any other type of hosiery, did not escape the effect of jobber ultraconservatism in the matter of forward business. Banking on a continuation of last year's bumper business, a number of manufacturers who abandoned staples as a part of their product, got into the sports lines inopportunely. Production of the fancy top ribs seems to have been increased in about the same proportion as output of staples in carded and combed was curtailed, with the result the market became topheavy before distributors had bought much more than samples for next season. Then samples of still more lines came out and buyers decided to place orders when it suited their convenience. Prices dropped slightly, enough, however, to give one manufacturer in North Carolina warrant for making no more fancy ribs, so long as jobbers were being quoted $2.75 a dozen.

A cotton half hose in which fairly good business has been done by a few manufacturers is finished in a way to give it the appearance of silk and wool in combination and the feel of wool in mixture with cotton. A good selling number is of black and gold, another favorite color mixture being black and cordovan. The sock sells to jobbers at $2.50 a dozen.

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It should have a good outlet at 39 to 50 cents a pair, depending on the class of trade to which offered by retailers. Cashmere half hose in natural, also at $2.50 a dozen, is moving out quite freely.

What looked like the bottom was reached last month in a sale of 200 needle full mercerized double sole half hose at $1.60, which is but a dime a dozen less than the market on double sole combed of 220 needle. A manufacturer of combed half hose whose lines are well entrenched was forced to reduce operatives' pay in order to arrive at a cost commensurate with the price he was able to obtain. The mill help struck and the mill was idle six or eight weeks. The manufacturer says the lower wage scale will prevail until jobbers are willing to pay value for goods. Mercerized half hose at low prices has been in right good demand for immediate delivery. Several mills after selling up increased their prices, with what result has not been ascertained.

Never before was novelty half hose shown in greater variety of pattern and construction. There developed last month a strong demand for silk-and-wool socks, and straight worsted goods also were in good call. Pattern is selling half hose at profitable prices. Scotch plaids will be extensively worn during the winter; in fact almost any sort of plaid, made with knitted in stripes, is a safe asset. It is possible the popularity of the knitted-in stripes will spoil the plans of establishments equipped for printing plaids on hosiery. But when it comes to horizontal bands of dots and dashes the printer is able to do what the knitting machine has yet to achieve at moderate cost. Anything in half hose that appeals to the college youth is a winner, whether of knitted or printed patterns, but it should be made with or in simulation of, dropstitch to toe. Ribs and dropstitch that do not extend to the toe reinforcement are a trifle passe in the eyes of the collegian.

Domestic exports of all classes of cotton hosiery for the eight months to August 31 aggregated 3,194,627 dozens. If the monthly average be maintained to the end of the year the exports will about equal those for last year, when the total was 5,159,750 dozens. During the same period there were exported 465,452 dozen pairs of silk hosiery, a gain of 165,247 dozens over last year, and 541,489 dozens of artificial silk hosiery, which was but a little more than half as many dozens as were sold for export in the corresponding period of 1923. Recently there was an increase in demand for fiber hosiery for export, while sales for the domestic trade fell off, as did prices, business in this construction picking up later.

An 18-inch fiber boot stocking with the three-seam back was offered a few weeks ago at $3.05 a dozen, and single seam, of coarser gauge, were quoted by one manufacturer at $2.60. Prices of fiber hosiery have declined with an increasing trend toward silk—seamless and full fashioned—since manufacturers some months ago came out with lower quotations.

One of the developments in the hosiery primary market in October was a materially better demand for full fashioned silk, at what appear stabilized prices. Many northern mills that were operating part time booked enough business to warrant running plants full time, and shipments have increased steadily. At least two mills in the South making full fashioned silk hosiery are operating at capacity, one of them overtime. Much of the silk hosiery business has been lost to jobbers. While they were buying from day to day and mills were in need of business, manufacturers turned to selling to the retail trade and to establishments employing door-to-door salesmen, with the result that, while jobbers may be selling less, mills as a whole are selling more.

Simultaneously with the brisker market there came a better inquiry for full fashioned knitting machines, from manufacturers displacing old equipment and others about to engage in the business. In the latter class is the Mulcahy Hosiery Co., with a Pennsylvania charter, capitalized at $200,000, which is in the market for machinery. A person speaking for a leading builder of full fashioned knitting machines says his company is receiving many more orders and that there is considerable installation for replacement. There is much second-hand machinery on the market, but the desirable is said to be held at high prices, while that which is available at low prices does not meet requirements for making stockings by the modern process at the lowest possible cost, it is stated.

Fortunately for the trade perhaps, the trend is toward the plain in silk hosiery, a return to staples in construction, and a fair degree of preference for light fabric. Cobweb-by hosiery is to be popular again, judging from dealer inquiry for the sheer, and incidentally there is no little stir over prospects for a wide open market for dollar-a-pair underhose of very light weight worsted. With the ankle encased in a $1.50 full fashioned sheer and a dollar understocking woman will have the snug fitting, lustrous fabric combined with the comfort provided by a smattering of wool—clad for appearance and warmth. The footless invisible worsted helps the sale of the sheer stocking and the popularity of the latter doesn't hurt the manufacturer of the underhose. But the combination is causing a shrinking of the market for plain mercerized.

One of the readily salable types of women's hosiery is the ribbed-to-toe of all mercerized or mercerized in combination with silk. It is a stocking with a go, because it looks well and does not cost a great deal. The lines of some mills have been sold well ahead for winter. Both the plain and the sportish are favorites with an element that likes the rough-and-ready appearance for street wear. But it's got to be ribbed to toe or made with dropstitch to toe. The flat-knitted mercerized for women is attracting about as much attention in the trade as combed stockings, quoted around $1.60 for double sole, 220 needles. Reports from scattered but identical manufacturers indicate that, comparing with January, the production of women's mercerized hosiery has been reduced by more than 45 per cent.

A new stocking for women is a hosette with a few hard rubber rings about the size of the now extinct two-cent coin worked into the narrow hem. The ring stocking is intended to supercede the full length worn rolled, and the rings are for carrying a dainty bit of ribbon for supporting it—yeleped garter—tied in a sort of necktie bow at the conventional distance below the knee. Another hosette of which samples are shown has the ribbon laced through the garter welt, which is ornamented at top and bottom with shell stitching. The three-quarter length hose is being tried out by means of the samples, and if they shall receive the o. k. of the trade, will be on sale for spring.

Speaking of innovations, a few manufacturers are knitting into half hose just below the ribbed top a narrow stripe in color, after the fashion of the resist stripe popular for several years in women's high grade silk hose, from which it is inferred manufacturers believe men have become more

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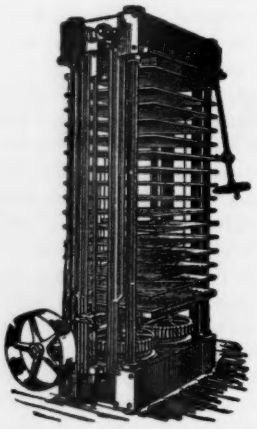

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addicted to fads than women are, for the time, the tendency in silk hosiery being toward the plain.

The infant's sock market has veered into a better situation, with some few jobbers placing repeat orders, although many have bought no more than sample lots. Buying has been so slow that, it is apparent, if it be much longer deferred, there will be another such tight situation as was witnessed last spring, when the socks were very scarce for immediate delivery and jobbers were complaining because shipments were reaching them late. The socks are shown in about 30 colors, and as each of a number of mills makes almost half that many patterns, it is easy to conceive the difficulty experienced by jobbers placing orders for future. Prices have become pretty well stabilized, after a period of unsteadiness, and this accounts in part for a change in jobber attitude. Mills now feel assured they will sell even more cases than for the season just ended, but that, in view of orders reaching them late, they will be under severe pressure when jobbers commence delivering to retailers for spring and summer.

An unusual situation exists in the underwear primary market, in an overlapping of seasons. The distributing trade is buying winter and summer garments, less of the latter, perhaps, than of the former, which by this time should have been contracted for to the end of the manufacturer season, and operating in light weights as though about completing the buying for summer.

Winter weights began moving briskly in September, with the first suggestion of lower temperatures, but there was a lull in the movement last month, when thermometers were registering June temperatures. Retailers bought or sold as the mercury rose or fell, and jobbers were being guided by what the retail trade was doing, with mills alternatively being pushed for business and waiting for it to come.

Some mills will close the year with fully as much production as last year; many will have had considerably less. A manufacturer operating several plants in the Central West sold more underwear in the six months to the middle of October than for the corresponding period of 1923, and orders continue to pour in, mainly for a few dozens or cases, invariably for spot shipment, which means retailers have bought as usual of the line. A few other mills have been favored to about the same extent.

The southern mills which started the ball rolling early by coming out with prices last November have had approximately the volume of business that at the start was estimated would come to them. Their big sales were in the early and latter parts of the season, with a distressingly quiet summer intervening. During the long lull there was severe curtailment of output, with the result some of their numbers now are out of stock and jobbers last month clamoring for October deliveries found themselves fortunate, in many instances, if they could exact promise of shipments in November. Winter underwear, it appears, will be going to jobbers beyond the end of the year, whereas under ordinary conditions mills would have completed their run by November.

Some of the northern mills, it is suspected, now are getting a larger volume of eleventh-hour business than was contemplated, for not a few last month were buying yarn. As they certainly would have made no contracts at that time for next year's opening, concerning which nothing is heard, it seems apparent they wanted the yarn for piecing out to the end of the current season. One mill, insisting on at-once delivery of 100,000 pounds, found a spinner sold up for the month and unable to accept the order. This, of course, was exceptional.

Considering the fact most jobbers are, apparently, buying heavy weights to cover for sales to retailers, they will have few, if any, winter garments to be carried in their January 1 inventory. Rather than have stock when inventorying they will buy sparingly for deliveries in early January, leaving it to manufacturers, as has been customary of late, to carry the bag for them. There is a question whether the position of cotton will not make cotton underwear a safe item in the inventory.

In the underwear primary markets there is more speculation over jobbers' ultimate intention in relation to summer lines than concern over the finish of the current winter season. Thus far distributors have contracted in only a miserly way for next year. Many have yet to place initial orders, and most of those who did, took little more than sample lots. One mill last month was reported having sold around 60 per cent of its season's normal production, and another supplies evidence that its sales were 50 per cent ahead of the volume to October last year. Very few mills, it is a safe assertion, could make so satisfactory a showing.

There seems no doubt not a few jobbers were left with light weights from last summer, a season that was abbreviated by a lingering spring and the September false alarm of the approach of fall. As retailers bought only from week to week, they cannot be suspected of having been caught with a carryover. In any event, remaining stocks, it is regarded certain, are so well scattered that no one interest will suffer to any great extent, and this is thought in the dry goods trades to be true generally of cotton textiles.

Every jobber may be assumed to have made a cleanup of certain lines, and in these there has been fairly good buying, so that almost every mill making men's lightweights is running, in some fashion, on orders. A Pennsylvania manufacturer operating half the plant has enough business on his books to carry him to December. Others, with from 25 to 40 per cent of their machinery running, also can go along on that basis for two to three months. Ordinarily these mills would have orders ahead to assure capacity operation into the first quarter of next year. The orders in hand among these mills, representing mostly men's lines, may be said to supply a very fair index of the restricted buying by jobbers. Several, however, manufacture heavy weights, and as they are included in the statistics the showing as to summer lines may not be quite so good as appears at first glance.

A manufacturer of women's light weights several weeks ago advanced his prices 12½ cents for vests and 25 cents for union suits. Whether he is booking business at the advances is not stated, but, contrary to rule, there recently was more activity in women's summer underwear than in men's.

One manufacturer brought out a line of artificial silk underwear for women. It is understood to have proved disappointing to him. A mill making the garments of artificial silk in combination with cotton, on the other hand, after discontinuing the manufacture of men's goods, is reported having had a harvest and at present operating full time with all equipment. This mill, it should be stated, sells to consumers direct, through an organization of door-to-

door sales people.

One leading jobber, considered by rivals as brutally frank, says he believes the jobber body is diminishing its number by forcing mills to sell to either retailers or consumers, and he would not be surprised to see goods scarce on very short notice. He points out that stocks, largely, have been liquidated; that there has been all-round curtailment for a long time, something that cannot be practiced indefinitely. He reasons that, this being the case, there must come a time—and it may not be far distant—when demand will assert itself, transforming a buyers' market into one in favor of sellers. He believes jobbers of dry goods, in which he includes underwear and hosiery, have reduced normal stocks to one-half. Eventually, he goes on to say, when jobbers wake up and stock up, for checking the trend to direct selling, nearly all will become heavier buyers, and probably at about the same time.

Another view voiced in jobber circles is that the knit goods trade may look forward to a long period of piecemeal buying by retailers and that, therefore, the jobbing trade will pursue the same policy. It will not be overlooked that in the event the retailer find himself missing sales because of placing the burden of carrying stock on others, and the spread of the house-to-house business, he will, unwittingly perhaps, do the very thing that would put the breath of life into the primary markets.

Among the Knitting Mills.

(*Continued from page* 97.)

operated at the new location in the future, under increased capacity.

Since the Wallace Wilson Hosiery Co., Philadelphia, established a branch factory in Salisbury, N. C., several months ago, other Pennsylvania mill owners have become interested in southern factory sites, and it seems likely at least two will remove plants or set up branch factories.

The Powell Knitting Co., Philadelphia, men's half hose, has under consideration the reports of two executives who inspected sites and received overtures. They were impressed with the opportunities offered by Georgia, where several locations were looked over. Since their return they have received interesting offers also from several communities in Texas. It is the intention to divert the manufacture of their cotton numbers to some southern point.

S. D. Bausher, president, and J. B. Lesher, treasurer and general manager, of the Unrivaled Hosiery Mill, Williamstown, Pa., spent some time in the South last month inspecting mill sites which had been brought to their attention. The object of the visit was to find a location to which to remove the plant from Williamstown. The operatives went on strike there a few months ago, apparently influenced by a textile workers' union organizer who made her appearance on the scene about the time a wage reduction was announced as a necessity for adapting production cost to prices obtainable from jobbers. The company is one of the better known manufacturers of standard combed half hose.

Another manufacturer who contemplates factory removal says he prefers the South "because there is found there more nearly 100 per cent pure Americanism than in so many textile centers where, after a strike has been declared, it is common for aliens to engage in disorder for perpetuating it or forcing surrender by employers."

Output Calculations on Hose Machines.

(*Continued from page* 96.)

and we can now deal with this as it were a single thread of one material worked throughout in the article. Using the set out above:

$$\frac{1000 \times 15 \times 22 \times 9 \times 24}{16\frac{1}{2} \times 840 \times 4 \times 7 \times 4 \times 36} = 1.27$$ pounds per dozen pairs as before.

The advantage of keeping the two materials separate is that there is less liability to error and we have as additional information the exact weight due to each material for it is often required to give the weight percentage of such a material as silk. These proportions also afford an accurate idea of the weights of each material to order so that a given contract may be filled. It also provides an accurate idea of the costs, for the weight of silk is multiplied by its cost per pound and similarly for the woolen thread, these added together giving the resultant price per pound of the mixture.

By a study of these methods along with practical experiment and confirmation of such matters as take-up, one can figure out with precision many of the items which are at present too often a matter for conjecture, and conjecture which in most cases is very wide of the mark.

United States Steel Corporation Purchases Cyclone Fence Company.

The consummation of negotiations have now been concluded, whereby the properties of the Cyclone Fence Company have been purchased by the United States Steel Corporation. The transfer of the Cyclone properties includes their factories at Waukegan, Illinois, and Cleveland, Ohio, also plants at Fort Worth, Texas, and Newark, New Jersey.

Through the acquiring of the Cyclone Fence Company, the steel corporation is entering into a phase of fence manufacture not heretofore practiced by them. It is understood that no change in policy is contemplated, the business to continue under the name of the Cyclone Fence Company, carrying on, with the exception of its principal officers, under its present organization as a subsidiary of the corporation.

During 1903 the Cyclone Fence Company commenced operations in Waukegan, Illinois, with a capitaliaztion of $25,000. They occupied a small building at the foot of Madison Street, which was added to as the business warranted from time to time, until they finally outgrew these quarters and chose their present location of eight and one-half acres in North Chicago, Illinois, erecting their present plant. Their capitalization was increased in 1906 from $25,000 to $100,000; in 1914 from $100,000 to $750,000; and in 1915 from $750,000 to $1,000,000, and later in the same year it was increased to $1,500,000.

During the year 1915 the Cleveland Cyclone Fence Company of Cleveland, Ohio, was purchased and in 1919 the Texas Anchor Fence Company of Fort Worth, Texas, was added to its holdings. In 1922 the Company purchased

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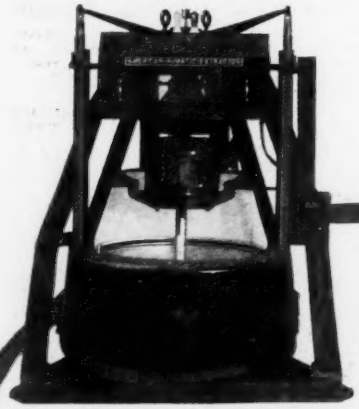

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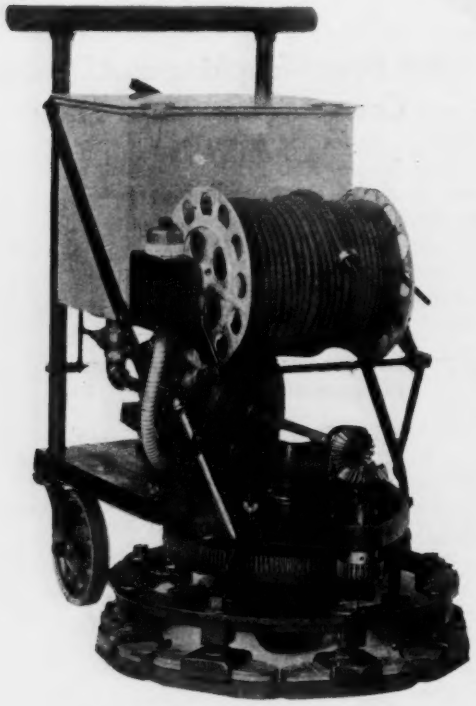
a site in Newark, New Jersey and erected a very modern and substantial manufacturing building.

A New Scrubbing Machine.

A recently developed machine of interest to mill men is the improved electric scrubbing machine which has been brought out by D. R. Vail & Company, 6754 Sheridan Road, Chicago, Illinois. This machine incorporates a number of features which seem to make it especially applicable for industrial work. The No. 5 model of the machine, upon which patent has been applied for, is shown in the accompanying illustration; this photograph shows the machine with the outer casing removed, revealing the bristle brushes. One feature of the machine is that these brushes may be removed and felt brushes substituted for them when the character of the work to be done requires it.



An advantage of the machine, which is pointed out by the manufacturers as making it particularly useful in rooms where machinery is close together and the alleys narrow, is the fact that it is short-coupled, and the manufacturers state that the machine can be turned around in its own length.

The brush ring of this scrubber is raised and lowered by means of a lever, which, it is pointed out, makes for easy handling of the machine from one part of the building to another, when it is not in use.

The machine is equipped with a squeegee for the purpose of conveying the dirty water from the floor to one end of the building or hallway. This feature is designed for efficient and clean scrubbing as well as to save time.

All bearings used on the machine are ball bearing, and all gears are standard.

Graton & Knight, tanners and leather belt makers, Worcester, Massachusetts, used the hides of 795 steers in making the leather belt required for the new Long-Bell Lumber Mill, at Longview, Washington. Reduced to units of one-inch single ply belting, this order called for 94,436 feet, or nearly 20 miles of belting.

STATEMENT

of the ownership, management, circulation, etc., required by the act of Congress of August 24, 1912, of COTTON, published monthly at Dalton, Ga., for October, 1924.

State of Georgia, County of Fulton.

Before me, a Notary Public, in and for the State and County aforesaid, personally appeared W. J. Rooke, who, having been duly sworn according to law, deposes and says that he is the Business Manager of COTTON, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, W. R. C. Smith Publishing Co., Atlanta, Ga.; Editor, L. L. Arnold, Atlanta, Ga.; Business Manager, W. J. Rooke, Atlanta, Ga.

2. That the owners are: W. R. C. Smith, Atlanta, Ga.; E. P. Smith, Atlanta, Ga.; W. S. Cushion, Cleveland, O.; O. A. Sharpless, Atlanta, Ga; J. C. Martin, Atlanta, Ga.; H. H. Kelley, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. O. Rogers, Atlanta, Ga.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or any other security holders are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs containing statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bonafide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. W. J. ROOKE, Bus. Mgr.

Sworn to and subscribed before me this 1st day of October, 1924.

(Seal) E. L. PHILPOT, Notary Public.

My commission expires March 13, 1927.

"FALLS OF PERSONS" Again Leading

Whenever accident statistics are published covering an industry not heretofore reported accidents due to "Falls" invariably are among the first three causes and frequently lead all the rest.

FALLS ARE DUE TO UNSAFE CONDITIONS
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such as worn stairs, improper ladder treads, smooth drainage gratings and covers and slippery walkways covered with grease, oil or water.

The recent table of Industrial Accidents in the California Oil Fields is similar to those in other industries and shows:

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